Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Chicago, December 20, 1930 | Issued Every Other Week | Volume XXXIII, No. 26

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Departments

(Rock Products is indexed in the "Industrial Arts Index," which can be found in any Public Library)

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542 South Dearborn Street, Chicago, Illinois, U. S. A.
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SUBSCRIPTION—Two dollars a year to United States and Possessions. Three dollars a year to Canada and foreign countries. Twenty-five cents for single copies

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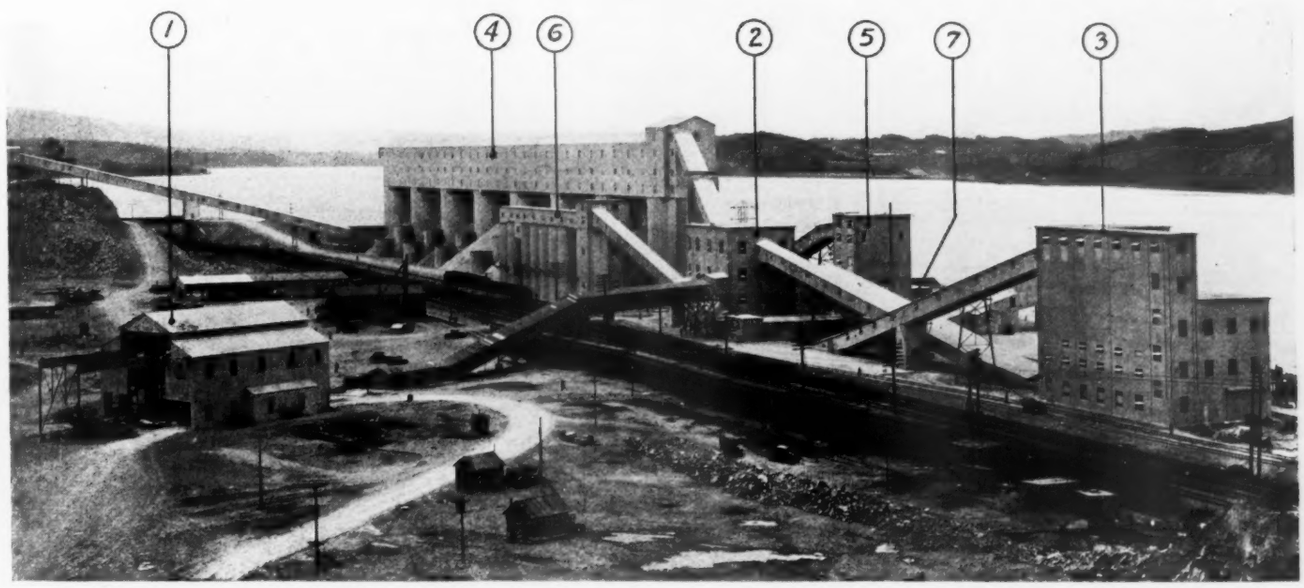


Clinton Point plant of New York Trap Rock Corp. looking over Hudson river. (1) Primary crusher. (2) Secondary crushers. (3) Scalping screens. (4) Main screening plant and storage silos. (5) Washer. (6) Silo for truck and rail loading. (7) Office, compressor room and shops

Growth of Stone Industry Typified by Modern Hudson River Plant

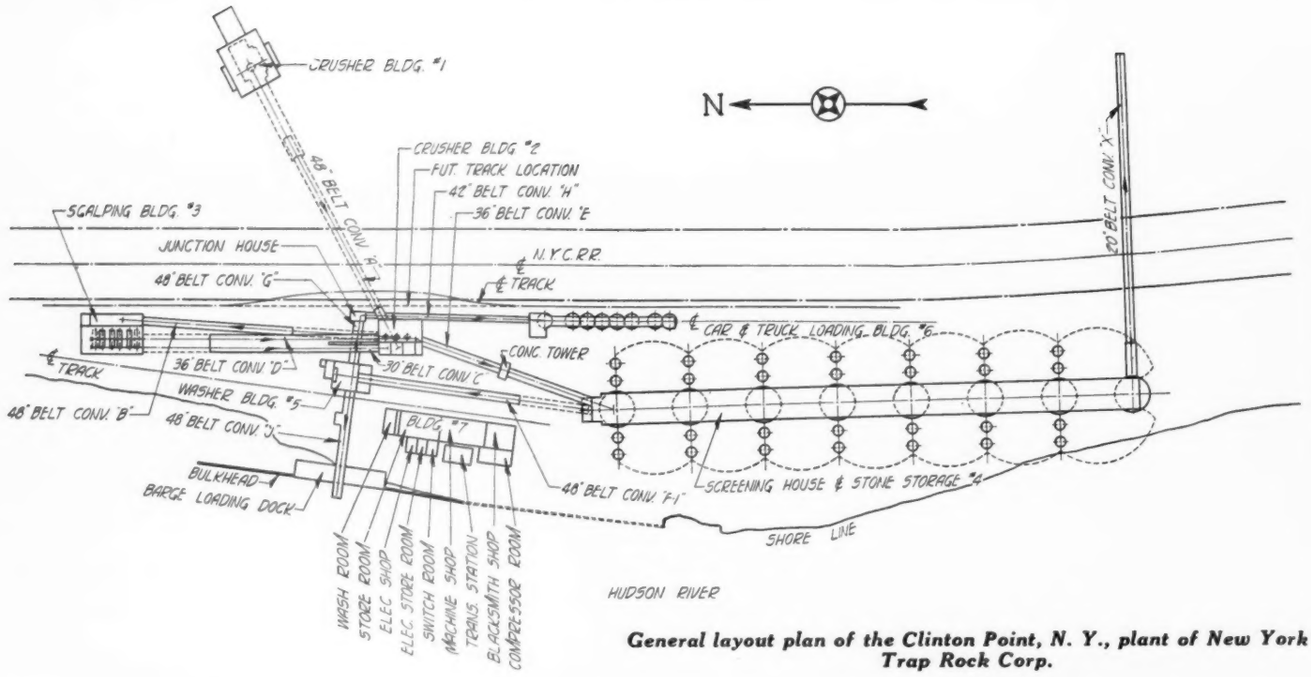
New York Trap Rock Corporation's New Plant at Clinton Point, N. Y., Probably Has No Peer to Date

IF one wished to trace the growth of the commercial crushed-stone industry from a humble beginning to a present-day conception of modern industrialism, through its various steps from old laborious hand methods to mechanical handling and processing, a better exhibit could not be found than the Clinton Point plant of the New York Trap Rock Corp.

The industrial historian could start with an infant industry whose birth was recorded under the name of the Barnegat Lime Co., in 1879. Some years later, in 1888, the New York Brokenstone Co. took over the operation. This marked the beginning of the commercial crushed-stone industry in this country's greatest metropolitan district.

The builders of that first humble crushed-stone plant with its two small No. 6, bottom-drop, Gates crushers and one No. 8 crusher probably did not foresee the increase in crushing capacity from 90 tons or thereabouts a day to the present plant's operating capacity of from 800 to 1000 tons an hour. Nor could they have foreseen a plant architecturally a thing of beauty and a monument to the best in engineering skill. Nor did they anticipate, probably, the coming transition from laborious hand drilling to a battery of eight electric well drills, or the changes that were to come from hand loading, first to steam-shovel loading and later to electric-shovel loading. The gang of men, a gang that at one time was so large that it required 18 foremen for its supervision, which once did this work has gradually been superseded by power shovels, until today a total of five steam and electric shovels load more stone in an hour than the men loaded in a day.

The old skippers on the sailing smacks that used to haul the crushed stone to lower Hudson river points, the trip to New York taking two days, with a net load of 90 tons (which, incidentally, was one day's produc-



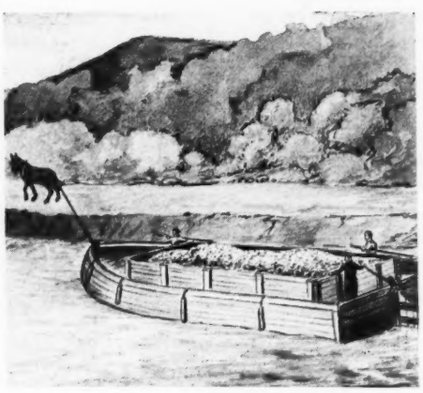
General layout plan of the Clinton Point, N. Y., plant of New York Trap Rock Corp.

In the early days boats carried 90 tons of stone—a day's output

tion), probably little dreamed that from these same quarries stone would be loaded to a fleet of barges, each barge holding from 850 to 900 tons of washed stone, in a fraction of the time that it took them to load one smack. Sailing boats were not the only means used for transportation, for 200-ton capacity barges were towed up and down the river. It took a whole day to load one of the 90-ton boats and two and one-half days to load one of the barges. Today an 850-ton barge can be loaded in 40 minutes.

Introduction of Power Drills

In 1890 the New York Brokenstone Co. sold its plant to the Clinton Point Stone Co. Following this, one of the first steps in mechanization was made, for the new owners installed steam drills and a steam dinky to transport the hand-loaded cars to the primary crusher. The inauguration of steam transportation at this plant was not without difficulties, for the steam dinky was built for standard-gage track and the cars for narrow-gage, making it necessary to have four lines of rails from a loading point to the crusher, a straddling standard-gage for the engine and a narrow-gage track between for the



Barges carried 200 tons and required 2 1/2 days to load

cars. These were drawn in a circle around the face of the quarry with the men stationed along the track to cast the stone into the cars.

Further expansions took place in 1891,

At one end of quarry the top and face are very irregular

View of part of quarry face immediately following a shot

General view of quarry. Building at left center is primary crusher house

when the old plant of the Storm King Stone Co. was purchased and some of the machinery installed in this growing plant. Two years later a set of rolls and an aerial rope tramway were tried out, but the tramway was soon abandoned and a return made to the hand loading and steam transportation. For the next decade few changes were made.

From 1910 to 1914, changes were more pronounced both within the organization and from a technical standpoint, for in this period the name of the company was changed to the Upper Hudson Stone Co. and the plant much enlarged. The early part of the period saw the purchase by the company of the holdings of the Cedar Cliff Stone Co. In addition, the first steam shovel was installed, a Marion No. 91, railroad type, as well as two American locomotives and a No. 21 Allis-Chalmers gyratory crusher. This primary crusher is still in service and functions for the same work for which it was originally purchased.

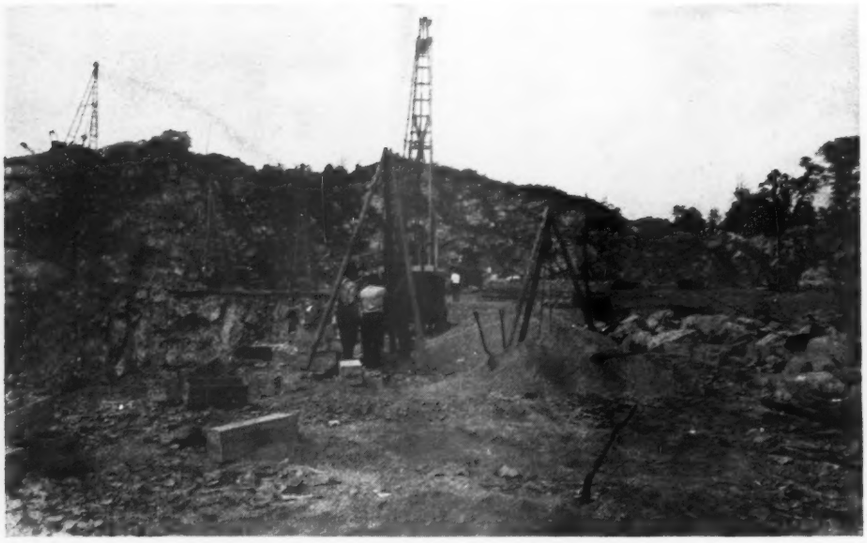
Tamping a well drill hole preparatory to a shot

Gradually, year by year, other equipment, both in the quarry and plant, was added. In 1915 a second Marion shovel (a No. 110) and two more locomotives were purchased. The following year an Atlantic shovel was added and still more locomotive equipment. Thus, year by year, as the demands for more and better stone increased, the operation grew, until by 1919 another milestone in the quarry's career was reached, when the entire operation was purchased by its present owners, the New York Trap Rock Corp., which continued the operation until the winter of 1929, when the old plant was completely dismantled, with a minor exception, so as to facilitate the erection of the present plant. Prior to dismantling, however, the old plant was operated while construction on the new unit was in progress up to a point that permitted the change from the old to the new plant without seriously affecting the delivery of stone to the markets being served.

In the February 15, 1930, issue of Rock

At upper end of quarry stripping is complicated by uneven surface

Electric shovels as well as steam are used in taking out stone from the quarry



Loading holes on rim of main working level

PRODUCTS, we published a short outline covering the high points in the design of this mammoth plant, as we considered the plant worthy of a short synopsis covering this feature prior to the inauguration of operations. The material for this present description was gathered and here presented after the plant had been in operation for several months, at which time the equipment had been adjusted and tuned up to its expected high operating efficiency.

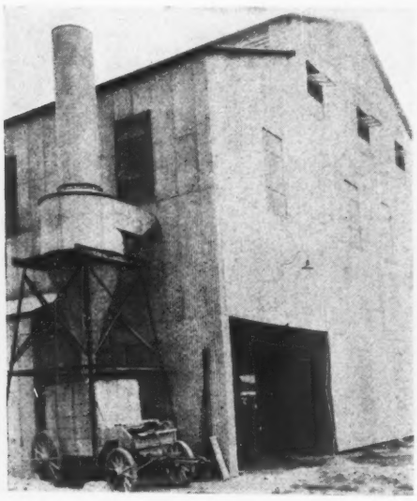
The new plant is located on the east bank of the Hudson river about eight miles below Poughkeepsie. The plant is divided by the main-line tracks of the New York Central railroad between Albany and New York City. The primary crushing unit is on the quarry side of the tracks, with the rest of the plant on the opposite side, the two units being connected by an incline and overhead gallery through which runs a 48-in. belt conveyor. It is only a stone's throw from the plant to the waters of the Hudson river.

From a strictly technical standpoint, the operation is unusual in five distinct ways: (1) No scalping or grizzly between primary and secondary crushing; (2) all stone is classified or screened and stored before washing; (3) no elevators—a 100% use of belt conveyors; (4) separate storage system for stone intended for water shipment and for railroad or truck shipments, and (5) the fines are removed during the last or final screening operation, being carried through the complete screening system.

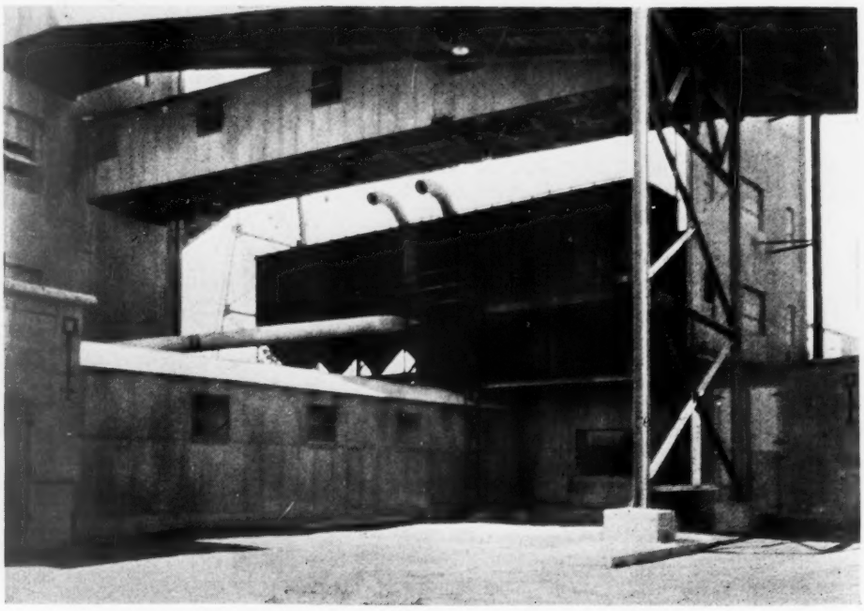
Construction of the new plant was not without difficulties, for not only did the old plant have to be continued in operation, for the most part, but construction work was hampered by the necessity of working in a limited space and by the busy tracks of the New York Central immediately alongside the new plant. Ten trains an hour speed past the plant, making extreme care and watchfulness necessary. Now a reinforced-concrete overhead crossing provides approach to the plant for the trucks.

As one speeds past the plant on a train, he is very apt to take the plant for a mammoth grain elevator, for the 16 tall, trim

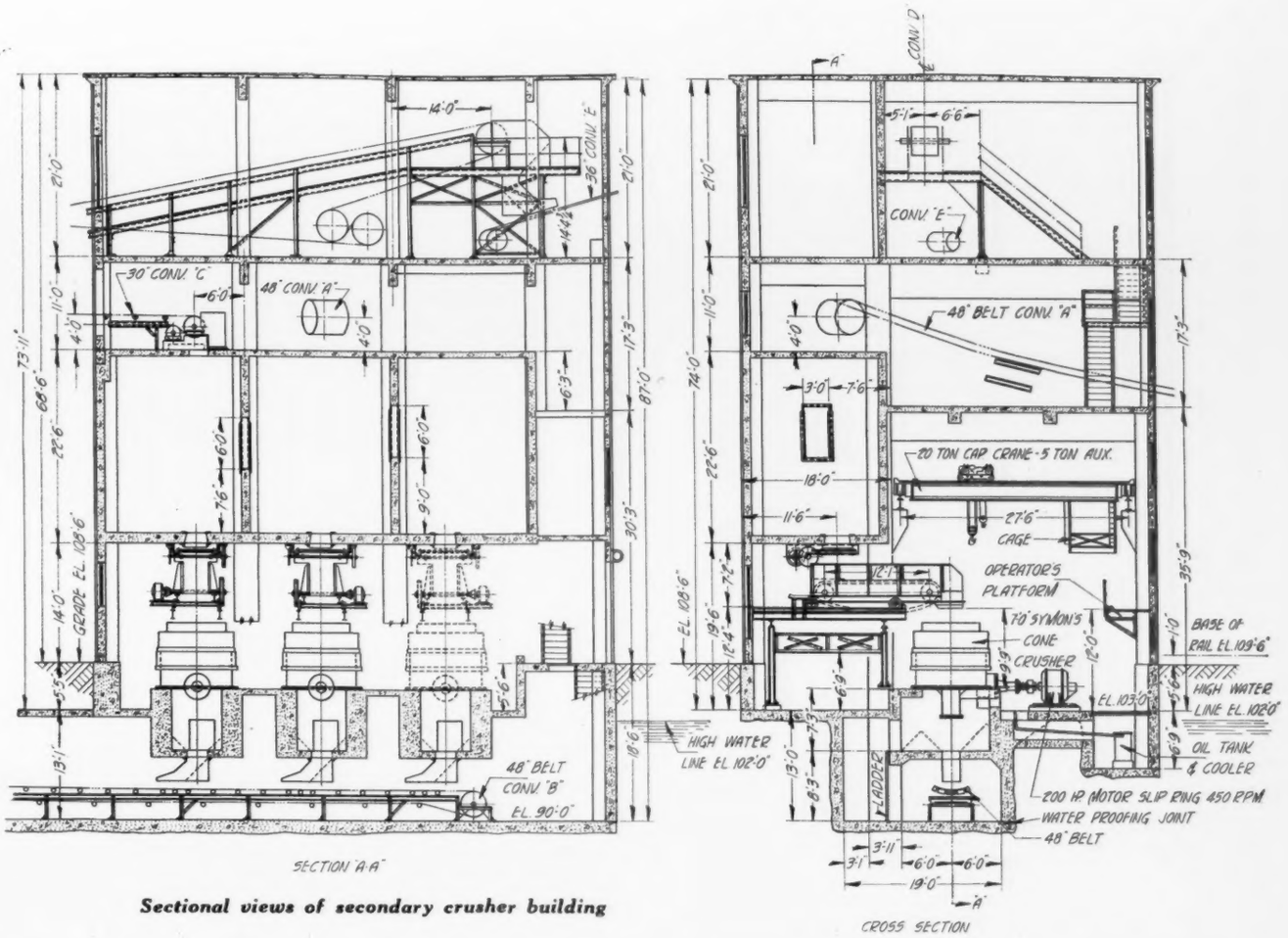
Spare parts can be quickly delivered to primary crusher by electric hoist extending out over the yard



Dust collector serving primary crusher



Dust collectors keep the plant remarkably free from dust



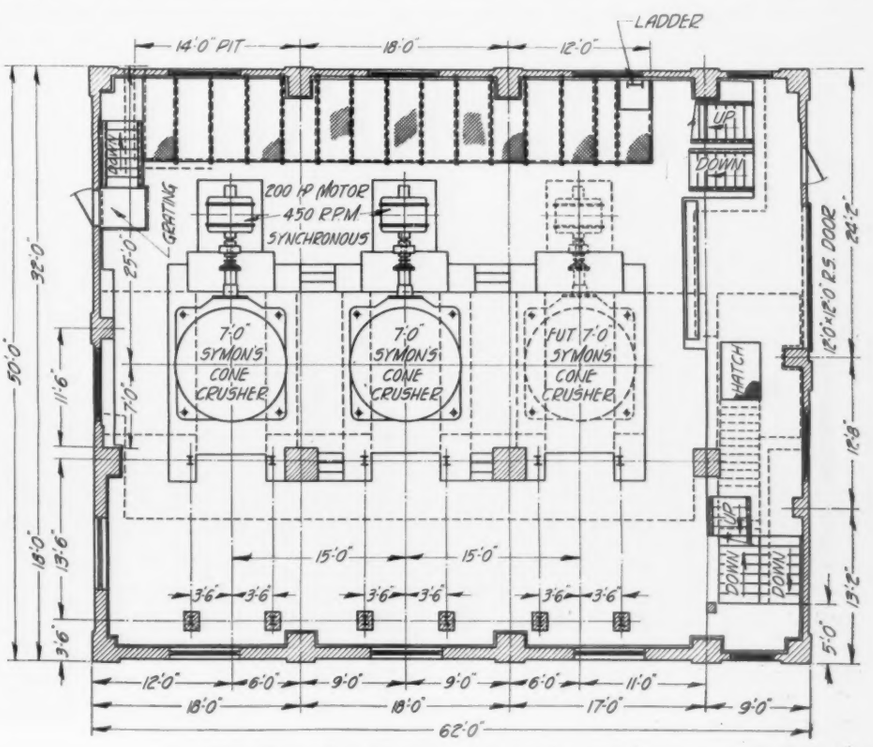
Sectional views of secondary crusher building

silos used for storage, all built of reinforced concrete, would give the uninitiated some such an impression. The extreme cleanliness around the plant would strengthen some such belief, for it would be hard to realize from such a fleeting glance that in reality he was looking at a crushed-stone operation, such is its ultra-modern design.

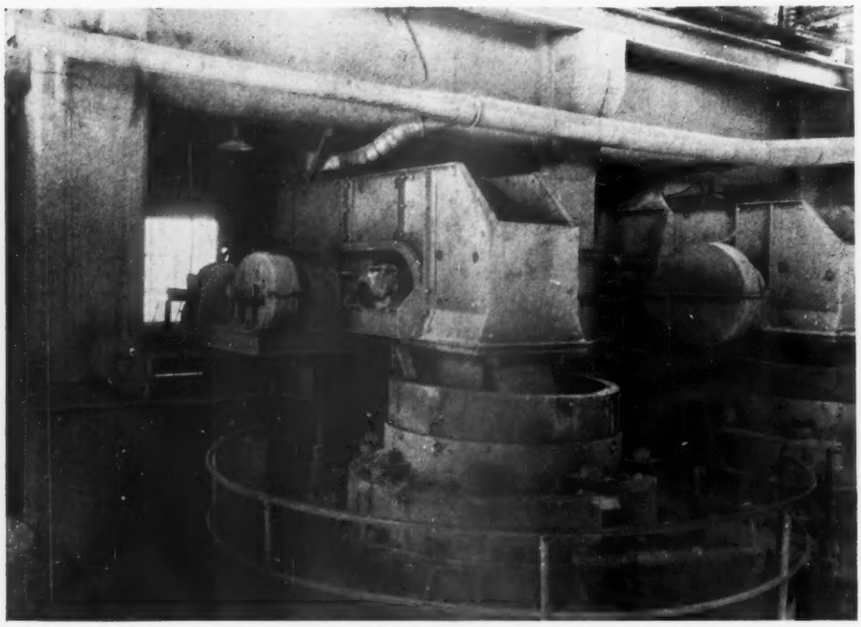
A feature that impresses the visitor familiar with crushed-stone operation is the entire absence of dust and the orderliness within and around the plant. Even within the buildings housing the various screening units, crusher houses, etc., the air is remarkably free from dust. At the primary crusher a No. 5 Northern Blower Co. fan gathers the dust and discharges it to a cyclone dust collector located just outside the crusher building. The rest of the plant is served by a Norblo dust-collecting system, probably the most complete ever installed in a stone-crushing plant.

The various units in the plant, from the secondary crushers on through the scalping house to the final screening plant, have been so laid out that additional equipment can be installed without excessive construction work for bins or foundation supports, etc.

The plant was designed under the direction of Sterling Tomkins, vice-president of the New York Trap Rock Corp., and E. Lee Heidenreich, Jr., chief engineer of the company. The general plans from which detailed drawings were later made were by A. C. Brunner and J. J. Carney, of the Burrell Engineering and Construction Co. This com-



First floor plan of secondary crusher building



Pan feeders serving cone crushers can be drawn back under bins to facilitate crusher repairs

pany also made the detail drawings and was awarded the construction contract, which included all buildings and conveyor bridges. The Lackawanna Steel Construction Co. had the sub-contract for the fabrication and erection of all the steel work. The electrical work was done by the New York Trap Rock Corp. under the direction of L. F. Miller, electrical engineer for the company. The trap rock company also did the excavation work for foundations and installed the machinery under the direction of W. S. McHenry, while Joe Q. Taylor acted as construction superintendent for the Burrell Engineering and Construction Co.

A new dock was built paralleling the plant and the river bank. The bulkhead and piling for this work was placed by Foley Bros., Inc., general contractors, of St. Paul, Minn.

More Than a Mile of Belt Conveyors

An outstanding feature of the plant, as already noted, is the extensive use of belt conveyors for elevating and conveying the crushed stone. No elevators of the bucket type are used. There are 32 conveyors that range in (center-to-center) lengths of from 795 ft. to 98 ft. and in widths of from 48 in. to 20 in. The center-to-center lengths of all the conveyors total 6528 ft. An idea of the magnitude of the belt conveyor installation can be gained from the fact that a total of 1595 hp. will be required to operate them to full capacity when the balance of the crushing and screening units for which foundations have been provided have been installed. The belts were all supplied by the Robins Conveying Belt Co., which also supplied the idlers and pulleys. All of the wider belt conveyors are tandem drive with the two motors direct-connected to Falk gear reduction units.

The details of each conveyor are given in the adjoining column. For convenience in following the flow of material through the plant, the conveyors are designated A, B, C, etc., in the order of their use or as nearly so as possible.

On the conveyors of wider widths, rubber-covered carrier rolls are used under the loading points to offset shocks. The idlers and pulleys for the 48-in. conveyors are of the 5-pulley type, equipped with Timken roller bearings and with the idlers mounted on steel channel supports. All other troughing rolls are 3-pulley, Timken equipped, with the return idlers Schaefer equipped and of the dead-shaft type, and all are Alemite lubricated. On the larger conveyors the takeups are of the vertical roller gravity type.

The conveyor drives are all Falk herringbone reducers, direct-connected to the drive pulley by Falk flexible couplings. The power is supplied by Allis-Chalmers motors, Types AR and ARY, 440-v. or 2300-v., 900-r.p.m., connected to the reducer by Falk couplings.

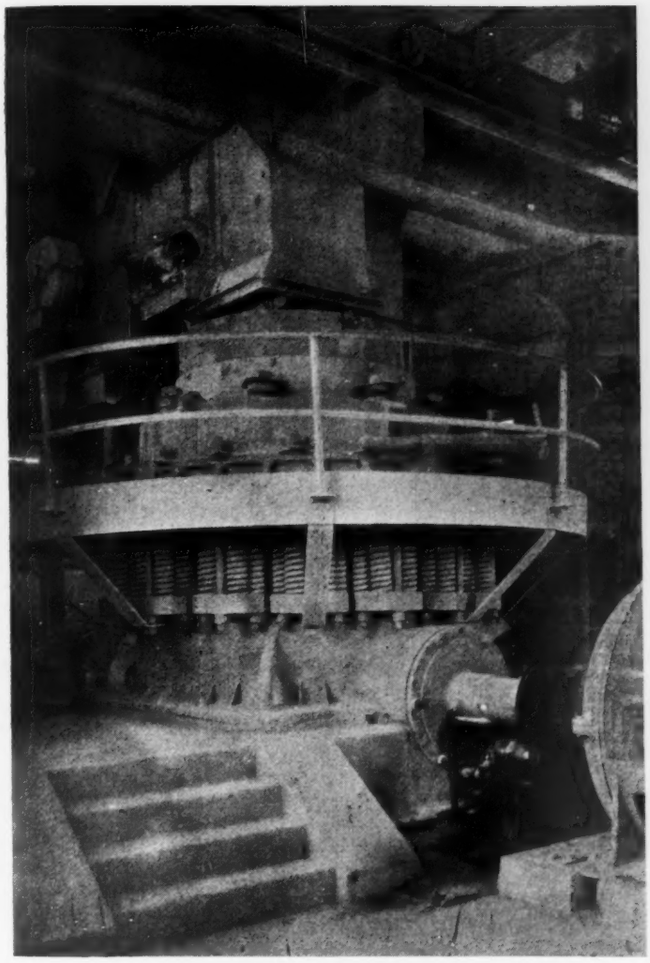
Quarry Operation

The quarry in the past was worked from what could be considered two levels, and the upper level extended back a considerable distance. At present all the rock for the plant is being taken from the lower level, thus obviating the necessity of stripping except at the north end of the quarry, where lengthening of the face is under way. Stripping here, owing to the unevenness of the surface, requires considerable hand work

DETAILS OF CONVEYORS AT THE NEW CLINTON POINT PLANT, NEW YORK TRAP ROCK CORP.

Conveyor	Belt, in.	Length, c. to c.	Capacity, tons	Motor, hp.	Speed reducer ratio
A	48	448	1200	200	36.6:1
B	48	430	1500	200	24.4:1
C	30	422	450	30	21.3:1
D	36	450	1000	150	18.8:1
E	36	301	1000	150	18.8:1
F	48	795	1500	75	24.4:1
F-1	48	370	1500	200	24.4:1
G	48	104	1500	20	21.3:1
H	42	316	1000	150	24.4:1
I	36	176	1000	30	21.3:1
J	48	108	1500	100	24.4:1
2 K	30	112	450 ea.	60	21.3:1
2 L	30	112	450 ea.	60	21.3:1
2 M	20	112	260 ea.	40	13.2:1
2 N	20	112	180 ea.	20	18.8:1
2 O	20	112	150 ea.	20	18.8:1
2 P	20	112	150 ea.	20	18.8:1
2 Q	20	108	130 ea.	10	21.3:1
R	30	98	450	5	21.3:1
S	20	98	260	5	13.2:1
T	20	98	130	5	21.3:1
U	20	98	130	5	21.3:1
V	20	98	130	5	21.3:1
W	20	98	130	5	21.3:1
X	20	460	300	30	21.3:1
Total amount of horsepower for all conveyors				1595	

An electric crane spans secondary crusher building



One of the two 7-ft. secondary crushers

Truck-dumping mechanism—trucks dump on either side of roadway

after most of the overburden has been removed by a dragline. The dragline loads to trucks for disposal of the debris.

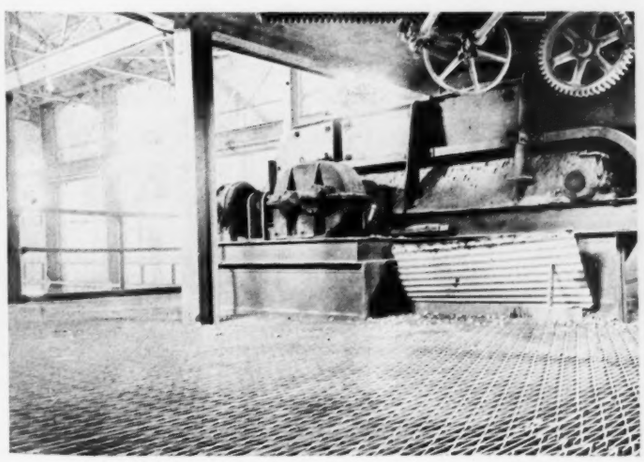
The 6-in. holes for primary blasting have been drilled in the past so as to give a 14-ft. burden and 13-ft. centers. All drilling equipment is being changed now from 6-in. diameter to 8-in. with a consequent increase in spacing. The holes are drilled 3 to 4 ft. below the quarry floor and du Pont, Hercules or Atlas dynamites are used as the explosive medium. Codeau-Bickford, electrically exploded, is invariably used, and the number of holes fired at each blast is not regulated except that no loaded holes are left to stand over night, as all holes that are loaded during a given day are shot that day. This is a safety precaution primarily. The lower quarry face has an average height of 55 ft. and is approximately 2000 ft. long.

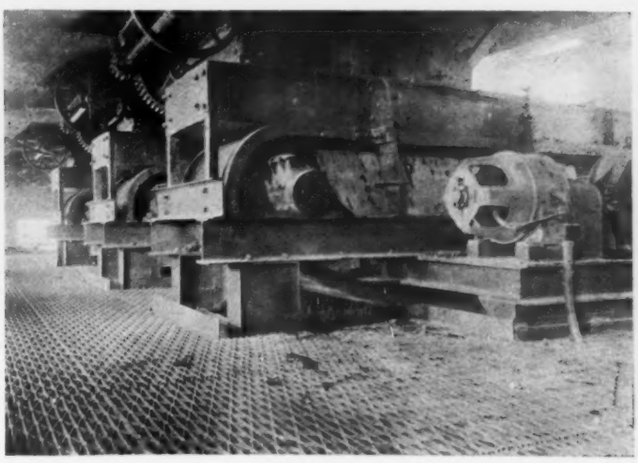
Special Blasting Precautions

As the quarry is so close to the main line tracks of the New York Central railroad, precautions must be taken to insure the safety of the passing trains. For this purpose, the company has a towerman employed by the New York Central stationed at the plant and he always telephones the chief dispatcher so as to find out if they have sufficient clearance in the passing of trains. At no time have there been any difficulties encountered, except that the quarry company often has to hold up primary blasting from 30 minutes to an hour when a train is late, but this blasting delay is not at all serious, as there is always plenty of stone ahead for the shovels to load.

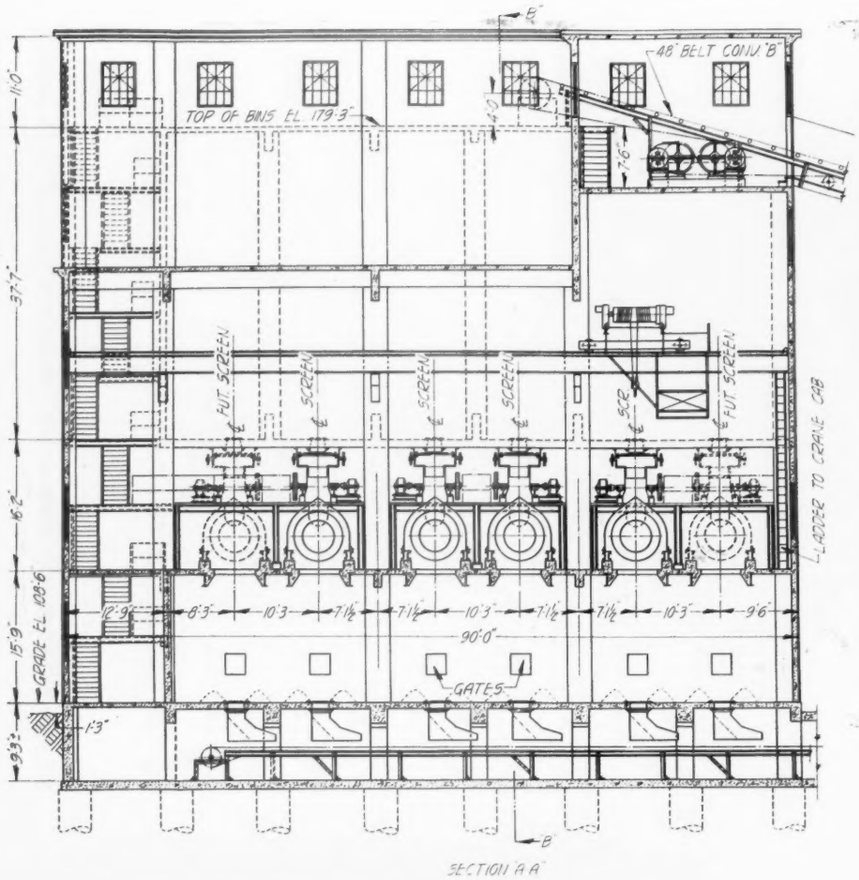
For primary drilling, eight Keystone and Sanderson Cyclone electric well drills are used. Three 50-B Bucyrus steam shovels and a 100-B Bucyrus-Erie electric shovel are used for loading stone in the quarry.

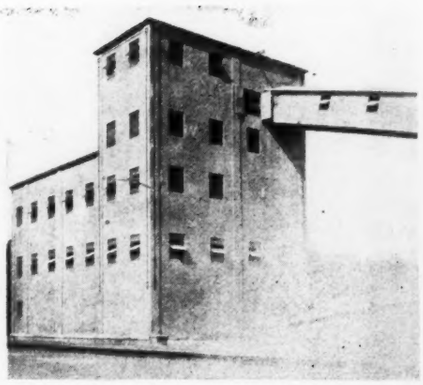
The quarry floor is approximately 15 ft. above the water level of the Hudson river and quite level and smooth, making conditions ideal for motor-truck transportation. Near the primary crushing plant the lanes of traffic for the trucks have been covered





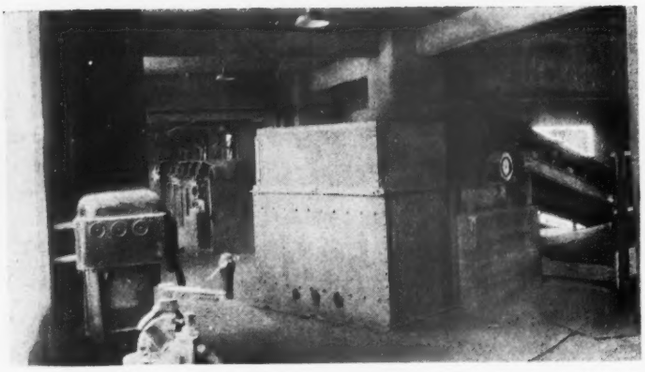
Pan feeders serving scalping screens



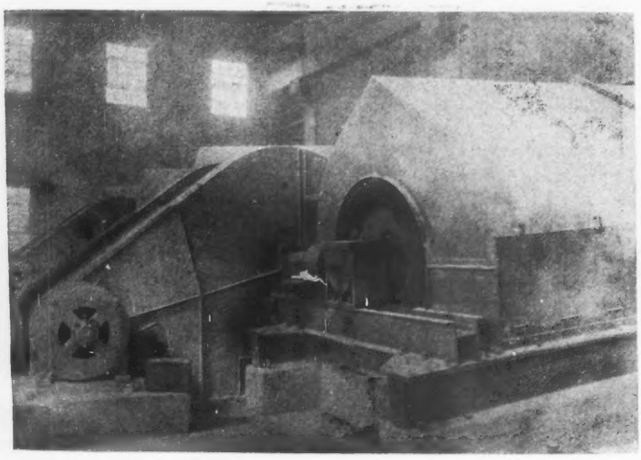


Building No. 3, scalping screen house

with waste fines from the screening plant. Owing to the tendency of such an improvised highway under continued heavy use to become uneven, the management is considering building a concrete pavement near the primary crusher at such places that are subjected to heavy traffic. The company expects to have 1500 ft. of 10-ft. concrete pavement on the quarry floor before the close of next season. From experience gained at its other

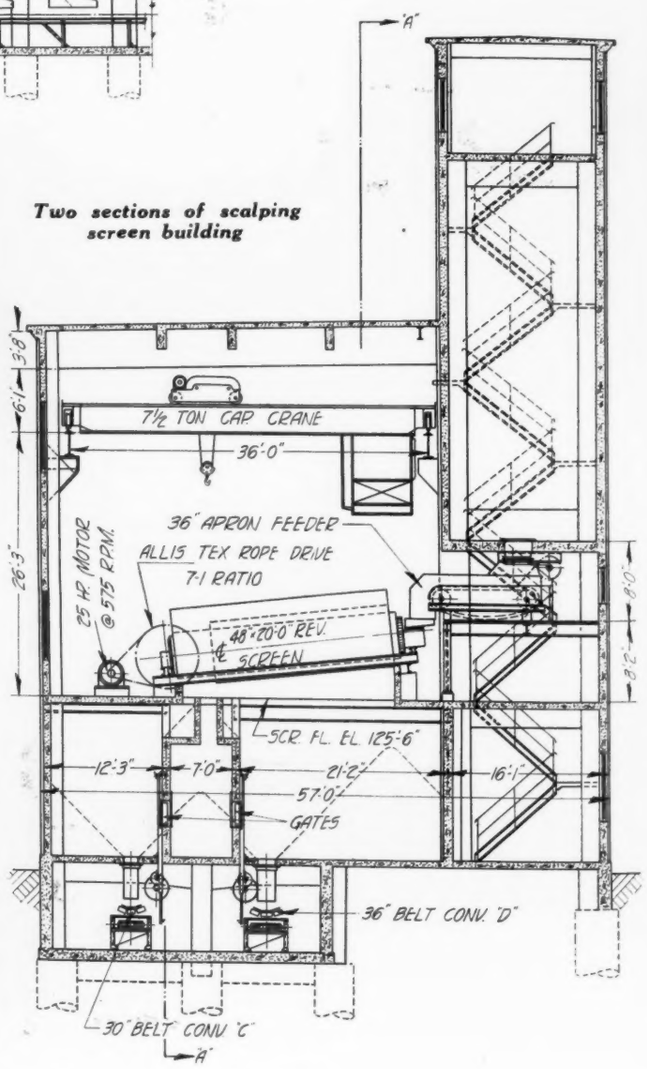


At right, 48-in. belt conveyor from primary crusher. Conveyor at left returning oversize to cone crusher



Rotary scalpers are enclosed in dust-proof housings

Two sections of scalping screen building



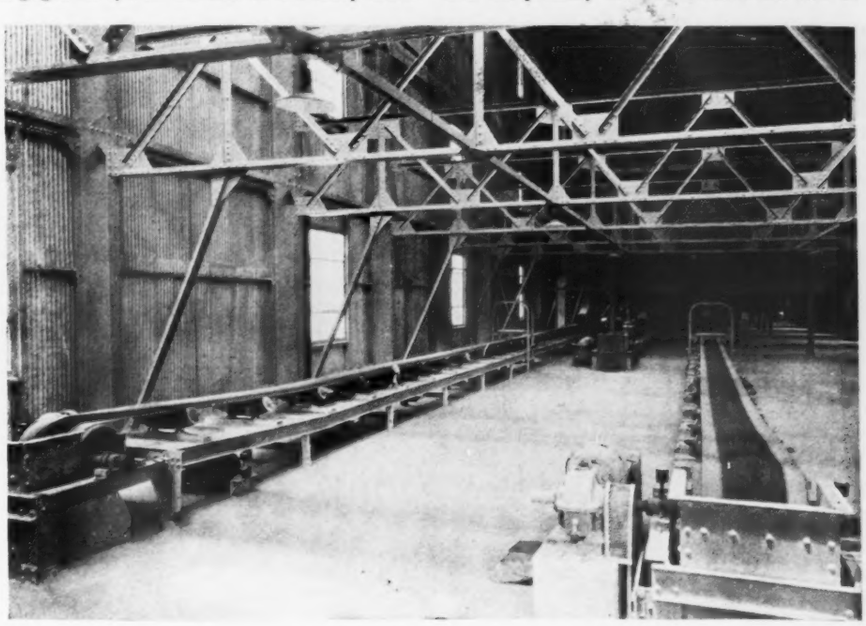
General view of screen house, showing belt conveyor system supplying batteries of vibrating screens

quarries using concrete-paved quarry roads, the engineers of the company do not anticipate any excessive wear on these pavements.

Fast Motor-Truck Haulage

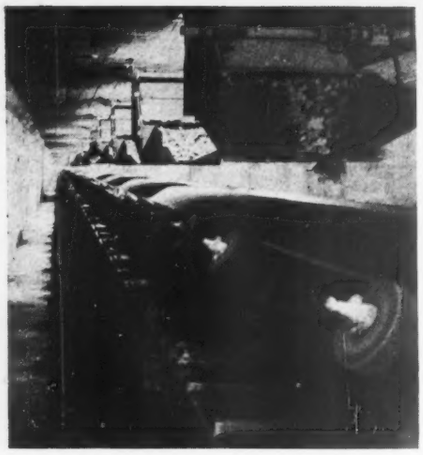
This haulage method of the stone from the quarry face to the primary crusher is accomplished by a fleet of 12 Mack 7½-ton trucks, each of which is equipped with side-dump Easton bodies and holds 5 cu. yd. of stone. The average haul is in the neighborhood of 750 ft., and it has been demonstrated that the 12 trucks can make a total of 240 dumps an hour under pressure, 100 dumps an hour being ordinary practice at present. This dumping rate is possible because the primary crusher is located in a 40-ft. pit and so arranged that trucks can be dumped to both sides of the crusher without the necessity of going up a grade or ramp or backing up. This means, then, that from 90 to 120 dumps an hour can be accomplished from each dumping position.

The trucks are dumped by a novel apparatus that was designed by the engineers of the trap rock company, and consists of a heavy steel framework and rails on which a 4-wheel traveler rides. The traveler is pulled up the incline track by a 20-hp. Shepard electric hoist, from which a suspended hook engages an eye on the side of the dump truck body, and pulls it up with a rapid and uniform movement, dumping the load of stone into the primary crusher. There are two of



Belt conveyors under vibrating screens carrying finer sizes to silos

Building No. 4, in foreground, contains the vibrating screens



Stone from storage reclaimed by long tunnel under stock piles. Note V lip of chutes

these hoists, one on each side of the crusher, so that during normal operation it can be said that there is a truck being dumped to the crusher continuously.

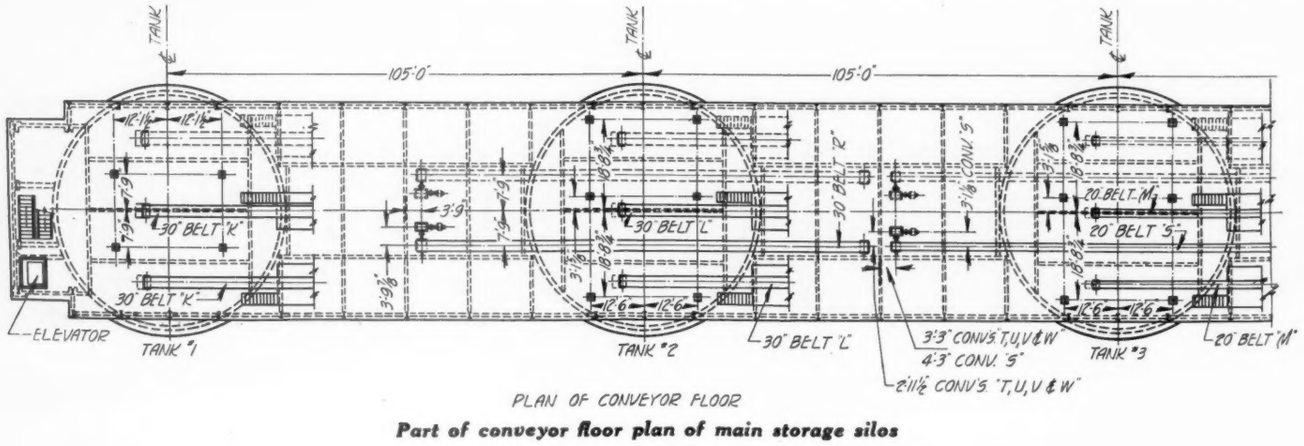
Primary Crushing Plant

As there is only one primary crusher, the original No. 21 Allis-Chalmers gyratory, that was a part of the older operation, a delay here would seriously affect the tonnage produced for that day. Hence, every means is at hand to dislodge any wedged stone and to quickly replace any broken crusher parts. For such work a 40-ton Pawling and Harnischfeger traveling crane, with a 10-ton auxiliary hoist, spans the crusher building, with an operator in the crane cab constantly.

The hook used for loosening any large pieces of stone has two ropes tied to it so as to span the primary crusher pit, with an attendant at each end of the rope. Thus when the hook is in need, it can be lowered instantly and guided to the proper position by the operators, preventing any delays or stalls in a space of time less than it takes to tell about it. The primary crusher is belted to a 250-hp. Westinghouse, Type CS, induction motor.

The traveling crane extends to a yard outside the primary crusher house, or No. 1 building, where a complete set of crusher parts is stored, so that replacements can be expedited.

From the primary crusher the stone, which is 9-in. and smaller in size, falls to a 48-in. belt (*A*) that carries it through an overhead gallery, over the main line tracks of the New



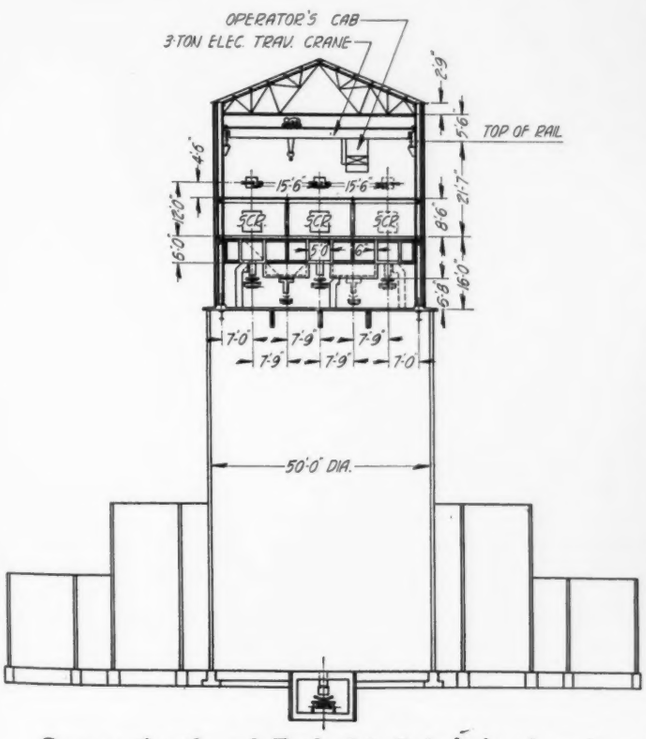
PLAN OF CONVEYOR FLOOR

Part of conveyor floor plan of main storage silos

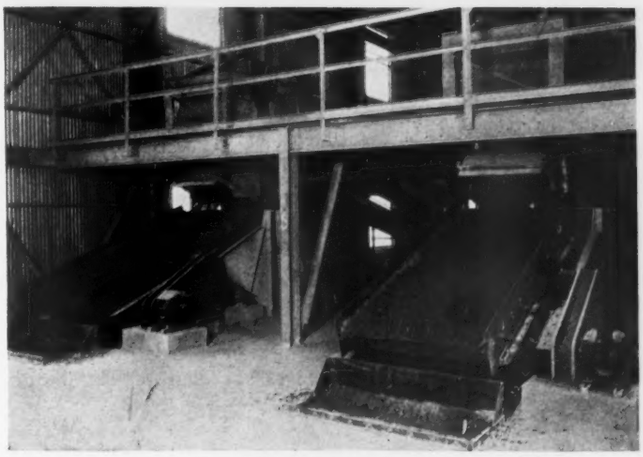
screens which are mounted over the storage silos

York Central railroad, to the secondary crushing plant, where the stone falls into a reinforced-concrete bin that serves two 7-ft. Symons cone crushers.

Two 7-ft. cone crushers are installed, and provision is made for a third cone crusher at a future date. One of the crushers is taking the unscalped stone from the No. 21 gyratory and reducing it to

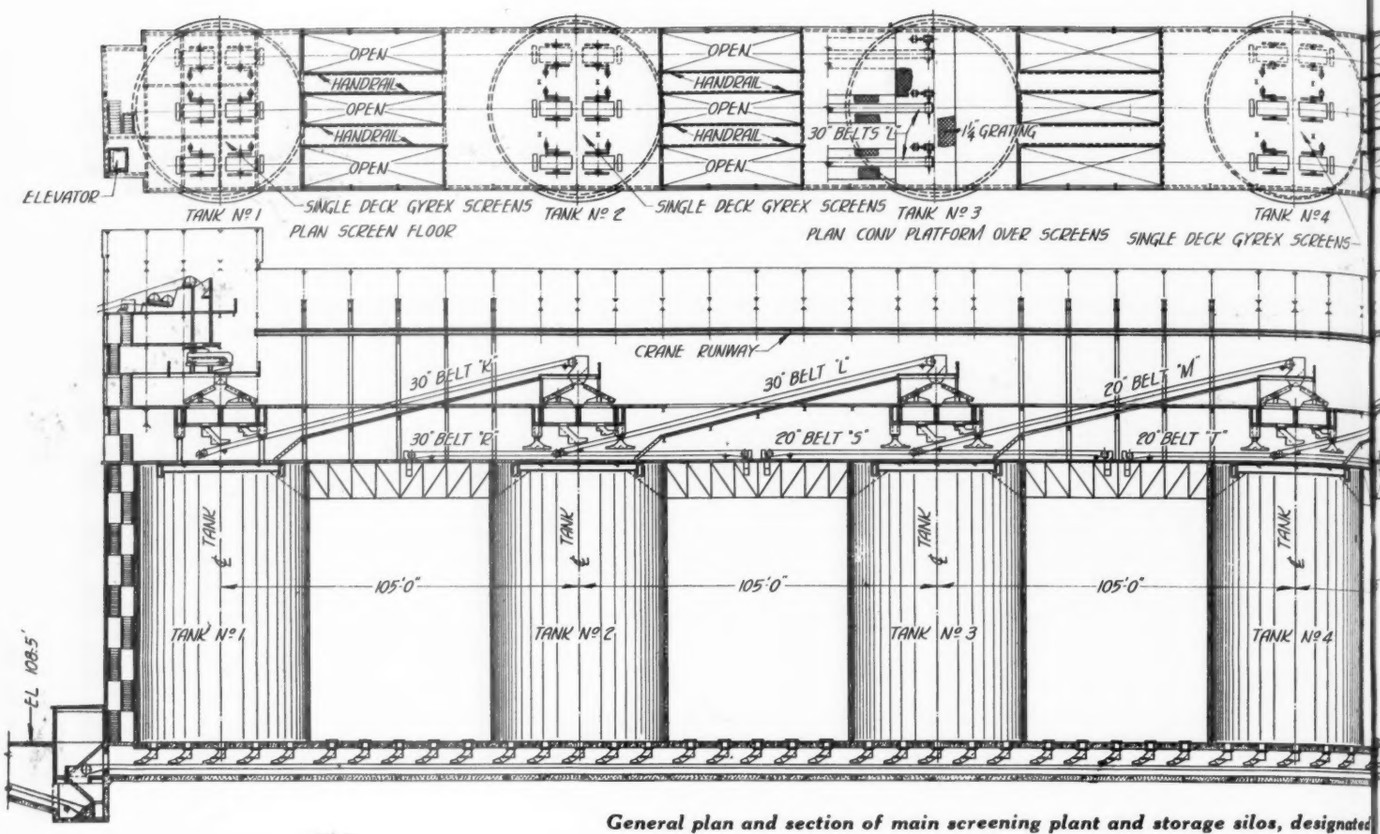


Cross section through Tanks 2 to 7, inclusive, in main screening plant



Vibrating screens for classifying large sizes

And similar equipment for smaller sizes



General plan and section of main screening plant and storage silos, designated as Buildi

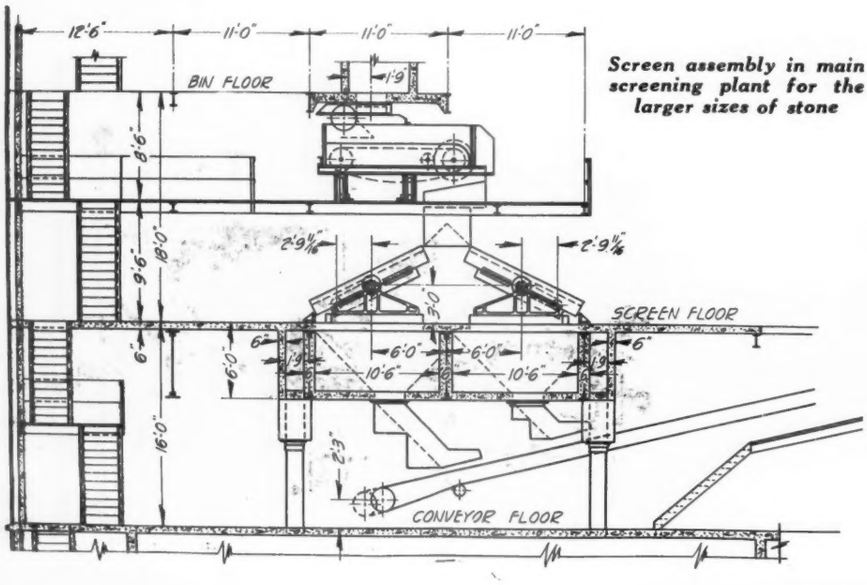
3½-in. This size is then sent to the rotary scalping screens and the oversize from these screens returned to the second cone crusher for further reduction to minus 2¼-in.

There are three reinforced concrete bins, 16 ft. long, 20 ft. deep and 15 ft. 6 in. wide, arranged in a single row, that act as feed bins for the cone crushers.

The building housing the cone crushers is flat-roofed and is 62 ft. long, 50 ft. wide and 74 ft. 11 in. high.

Each of the Symons cone crushers is fed by an individual Traylor manganese-steel apron conveyor. These feeders are so arranged and constructed that they may be pulled back on rails out of the way of the crushers to facilitate any repairs to the crushers. Each apron feeder is fed by a rack-and-pinion gate designed by the engineers of the stone company. These gates are Timken roller-bearing equipped. Spanning the secondary crushing plant is a P. and H. 20-ton electric crane with a 5-ton auxiliary hoist.

The apron feeders feeding the two cone crushers are driven by 10-hp. Allis-Chalmers motors through Falk speed reducers. The third and newest feeder uses a No. 3 Reeves and Robins reducer. Each cone crusher is direct-connected to a 200-hp., 450-r.p.m. Allis-Chalmers synchronous motor.



Screen assembly in main screening plant for the larger sizes of stone

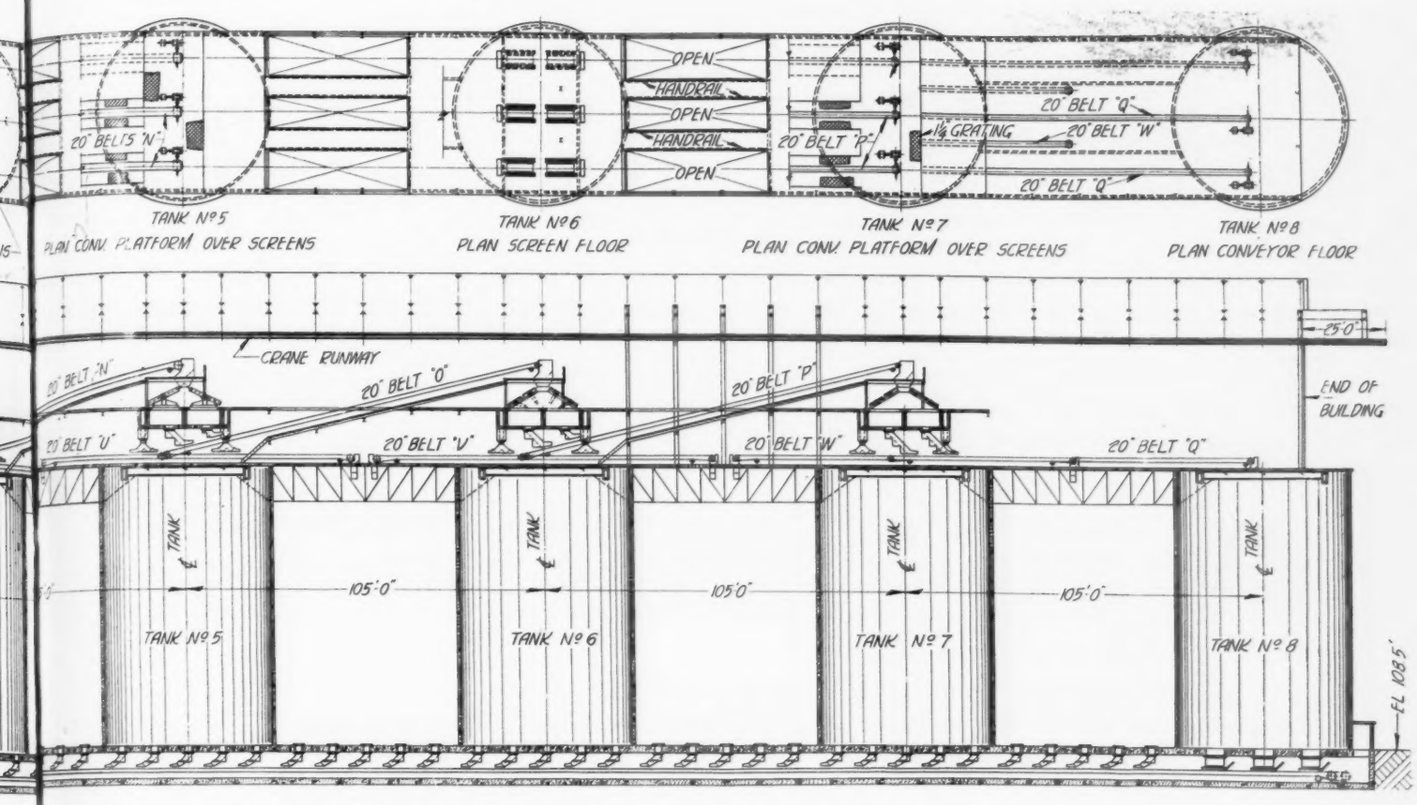
Screening Plant

The stone from that cone crusher receiving the rock direct from the offbearing belt of the primary crusher, discharges to belt *B* and is conveyed to the scalping house, or building No. 3. Here the stone falls to concrete bins that act as feeders for the four 48-in. by 20-ft. Allis-Chalmers rotary screens. Each screen is fed by a 36-in. Traylor apron feeder driven by a 10-hp. Allis-Chalmers motor through a Falk speed reducer, with the pan feeders in turn fed by rack-and-pinion gates. The bins feeding the scalpers are arranged so that one bin serves two scalpers, with an extra bin for further scalping installations. The bins are each approximately 22 ft. long, 13 ft. wide and 37 ft. 7 in. high.

The rotary screens and their Texrope drives are all enclosed in sheet metal housings, thus reducing the dust to a minimum. During dry weather, water can be sprayed on the rock entering the feed bin for the scalpers so as to reduce the amount of dust, but not in sufficient quantities to have any washing action.

Provisions have been made for the installation of two more rotary screens should they be deemed advisable, and at the time of inspection part of this space was being used for experimenting with a Robins vibrating screen as a scalping unit.

The rotary screens are used solely for



as Building No. 4. The reclaiming tunnel belt is shown in the lower drawing

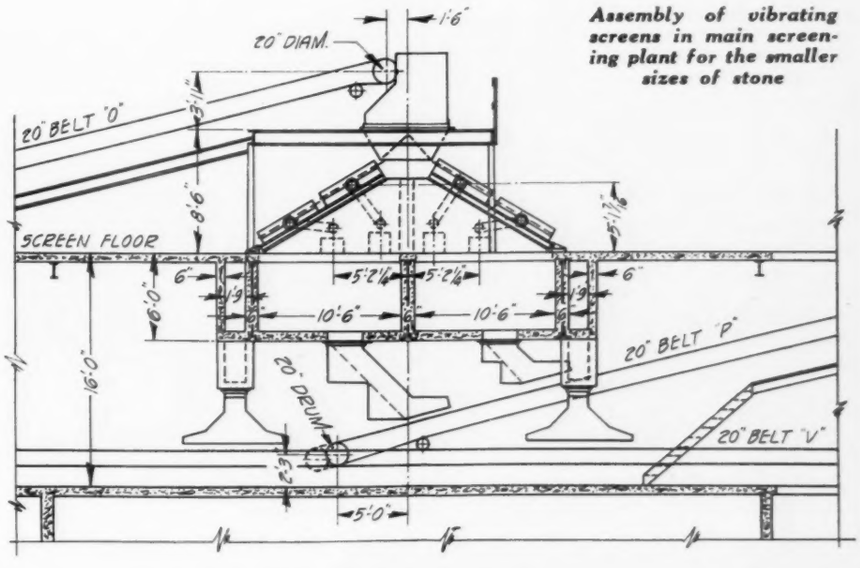
scalping purposes, but in the event that a larger amount of small stone is desirable, an intermediate size (2¼-in. to 3¼-in.) can be returned to the cone crushers by belt conveyor *C*, which also acts to carry the rejects or plus 3¼-in. back to the secondary crushers. The minus 2¼-in. material from the scalpers falls to a bin, from which the stone is fed to conveyor *D* and then to conveyor *E*, by means of which it reaches the final sizing screens.

The bins under the scalpers are flat-bottomed and provide for storage of three products, the oversize, the minus 2½-in. and the 2½-in. to 3¼-in. sizes. The first two sets of bins discharge directly to their respective offbearing belts. The intermediate product has no separate belt but can be chuted to either belt by either of two vertical wall gates that are set in the partitions between each set of three bins. The two gates are controlled from the conveyor gallery tunnel in which ride conveyor belts *C* and *D*. (By reference to the line drawings the size and respective location of the bins can be determined.)

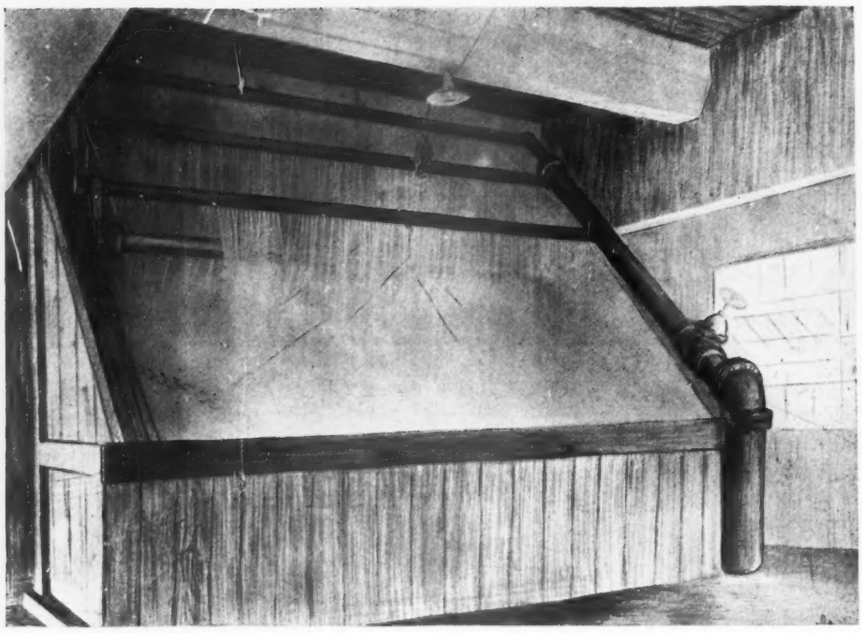
Electricity Meters on All Operations

Also, in building No. 2 (secondary crushing building) is located the electrical control equipment, which includes individual power meters for each crusher and meters showing the power consumption for the other operations as well. For instance, meters are available showing the power consumption for crushing, sizing, scalping, washing, loading, etc. By the use of such meters not only are the various operations visible but power troubles and motor overloads can be anticipated. There are 29 of these control panels in a separate room. These control panels are all General Electric equipment.

It might be said at this time that all the machinery in the plant is electrically interlocked so that in the event one machine stops, all operations ahead of that unit are cut out automatically and their operation stopped. Should there be a breakdown, for example, on the belt carrying the crushed stone from the cone crushers to the scalping house, the operator would immediately stop that belt and in doing so would automatically stop the dumping of any trucks into the primary crusher and the feeders to the secondary crushers, but the crushers would not stop, as small discharge bins are constructed under the crushers to take any load they may be carrying, thus eliminating the necessity of stopping a crusher while under load. The stopping of any machine or conveyor automatically stops the feed to all moving parts ahead of the machine stopped. At the same time, a red light would show at the starting panels, thus warning the operators that the line was down. As an additional



Assembly of vibrating screens in main screening plant for the smaller sizes of stone



One of the upper washing screens of the cascade series

warning and as a call for assistance, the operator would press a signal button three times that would blow a signal horn in all buildings as a warning that something was wrong in building No. 3, and the other operators would then go to that building and give any needed assistance. By this method not only is flooding trouble eliminated but also a minimum repair crew is made possible.

Screening Practice

Perhaps the most impressive feature of the entire operation is the method of screening and the marked novelty of the screening installation itself.

This building (No. 4) consists of eight huge silos, each 50 ft. in diameter and 80 ft. high, placed on 105-ft. centers. These silos each have four smaller wing silos, that act as a retaining wall, for segregating the various sizes of stone in the outside storage space. There is a total storage capacity of 142,000 cu. yd., of which 100,000 cu. yd. are reclaimable by gravity and 42,000 cu. yd. by cranes or other mechanical equipment. Mounted over these silos are the vibrating screens and conveyors incidental to the operation.

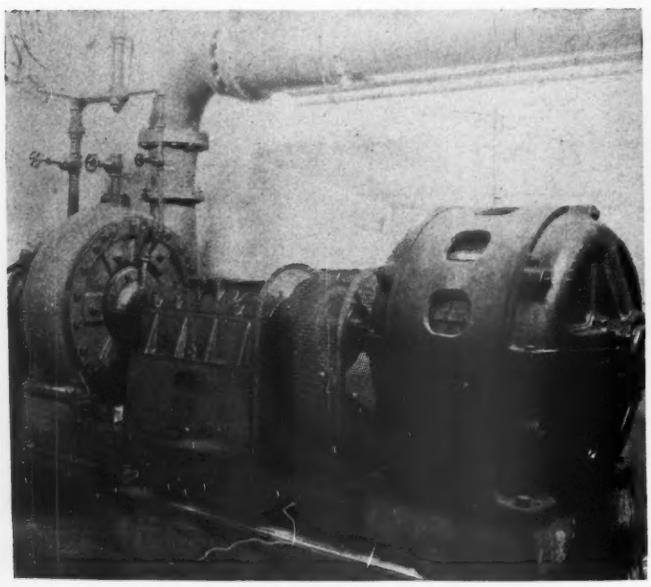
There are four 48-in. by 120-in. single-deck Robins Gyrex screens over each of the first five silos, arranged with two back to back, with each vibrating screen driven by a 5-hp., 900-r.p.m. Allis-Chalmers motor through a Texrope drive. The first set of screens over No. 1 silo is fed by pan feeders, but all succeeding screens are fed by 30-in. and 20-in. belt conveyors that are arranged in two parallel rows to each screen. The 30-in. conveyors are under the first two batteries of Gyrex screens, and the 20-in. belt conveyors serve the vibrating screens.

The minus 2¼-in. material, or when desirable the minus 3¼-in., from the scalping screens in building No. 3, passes to conveyors *D* and *E* and is delivered to two small bins ahead of the first set of Gyrex screens. The first set of screens is provided with 2½-in. manganese steel wire cloth for the preparation of the 2½-in. to 3¼-in. stone. The remaining six batteries of Gyrex and Vibrex screens are provided with 1½-in., 1¼-in., 1-in., ¾-in., ⅝-in. and ¼-in. wire cloth. Provisions for installation of two additional screens over each silo have been made.

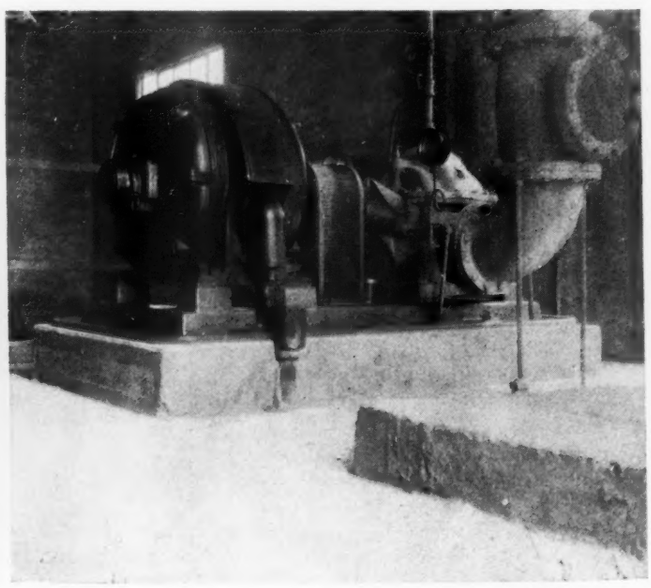
Over silos Nos. 6 and 7 are batteries of Robins Vibrex screens, each battery consisting of eight single-deck, 42-in. by 120-in. screens, with provision for the future installation of four additional screens in two units. The Vibrex screens are mounted in each battery in fours, back to back, and with two screens above two, as shown in the illustration on page 35. Each of the Vibrex screens is driven by a 2-hp., 900-r.p.m. motor through Texrope drive.

The material going to No. 1 battery of screens produces the 2½-in. to 3¼-in. stone, which falls to No. 1 silo below, the minus 2½-in. stone falling to a pair of 30-in. inclined belt conveyors that deliver the stone to the battery of vibrating screens over No. 2 silo. Here the 2¼-in. to 1½-in. stone is produced, which falls to its silo below. Similarly, the minus 1½-in. stone falls to a pair of 30-in. inclined belt conveyors and is delivered to the screen battery over No. 3 silo. Thus the seven batteries of screens receive and discharge their two products to silos below or to their offbearing belt conveyor.

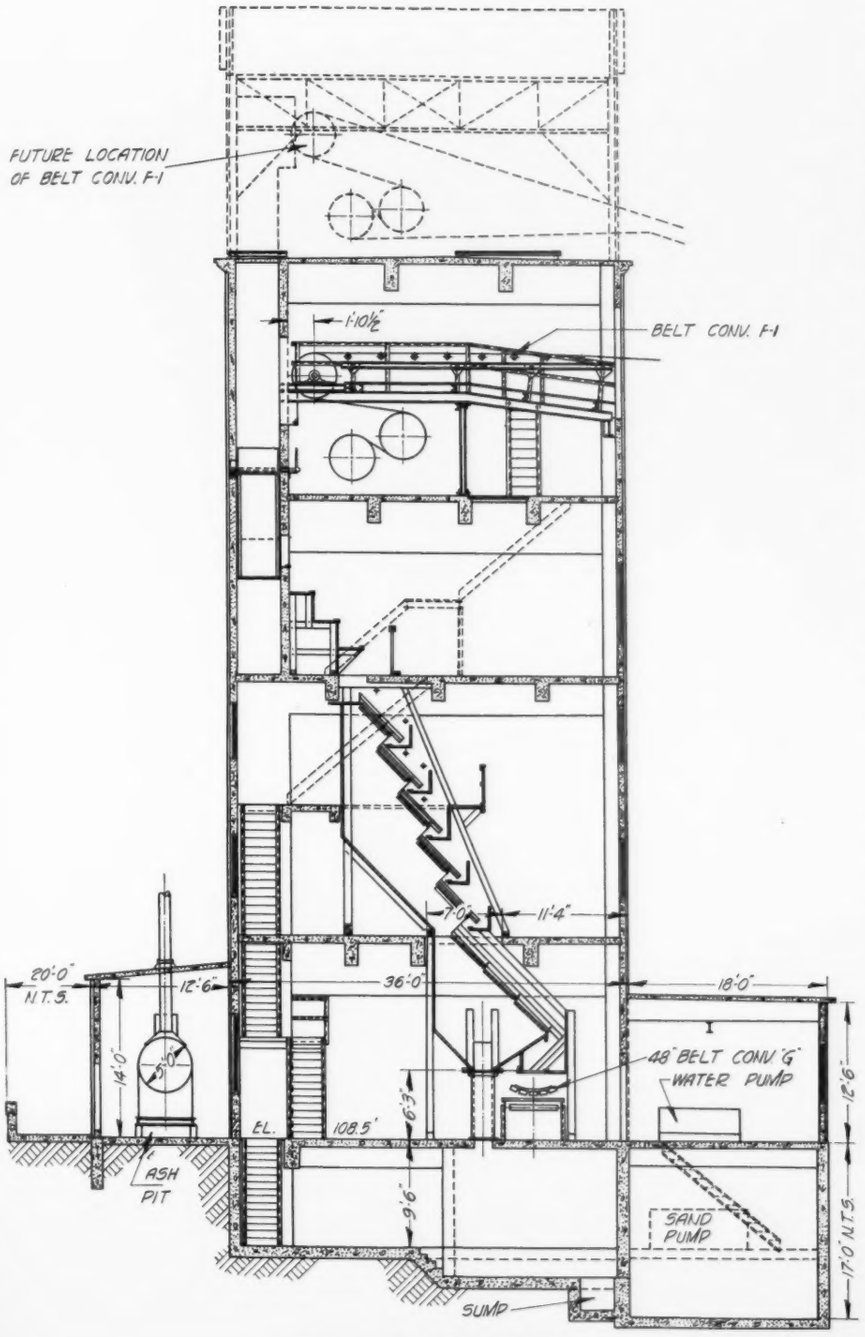
The screens are so located that direct discharge to ground storage between silos



Pump for handling silt and sand from washer



Pump of 3000-g.p.m. capacity supplies water for washer



Section of washer building

is not feasible, so 20-in. horizontal running belt conveyors are provided for this purpose. These conveyors rest on top of the concrete slab over the silos, which acts as the main floor for the screening building, and are reversible so that the storage space between the silos can be used for either of one of two sizes of stone.

Silo No. 8 is used for storage of the minus ¼-in. material from the final or end battery of Vibrex screens.

To deliver this material to storage from the end screen, two parallel, horizontal 20-in. belt conveyors are mounted on top of the silos, as shown in the illustration.

Another unusual feature for a crushed-stone plant is the installation of an American Elevator and Machine Co. passenger elevator at the north end of the screening building for the convenience of the operating men.

Special Features of Buildings

The structural work over the silos is all of steel, with the building itself enclosed in corrugated metal siding. The floors, for the main part, are of concrete, with runways provided with Irving subway floor treads. Ample light is obtained from a multitude of windows in steel sash.

A 3-ton P. and H. electric crane spans the screening building and can travel about 800 ft. along the entire length of the building.

It will be recalled that the stone is not washed until after the sizing operation, hence the amount of minus ¼-in. material that is produced varies widely, depending on the dryness of the rock, amount of overburden included, as well as variations in crushing practice. Ordinarily there is more of this material produced than the market can absorb, so that considerable of it is drawn from the silo to a 20-in. belt conveyor (*X*) which carries this material up and over the tracks of the New York Central railroad to a point on the south rim of the quarry. Here the minus ¼-in. product falls to a bin from which the material is drawn to trucks. At present this material is being hauled to a depression well to the rear of the quarry, where the fines will be out of the way of future quarry operations, yet available should future markets develop.

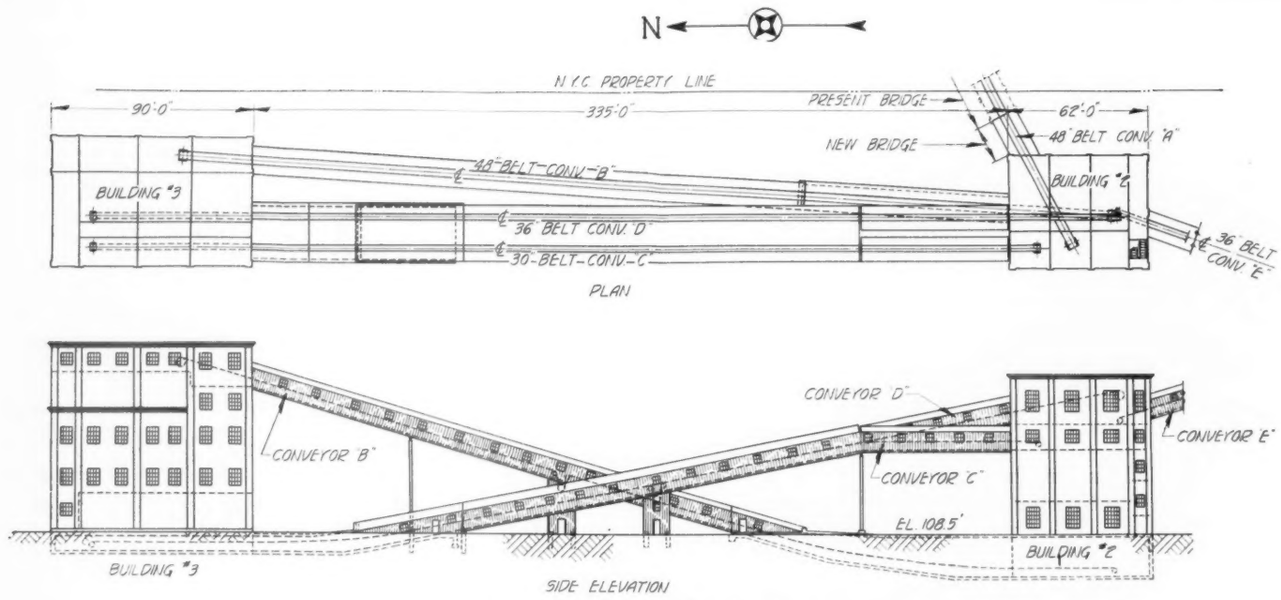
The stone from the concrete silos or the ground storage space in between, is drawn to a 48-in. belt conveyor (*F*) that runs through a reinforced-concrete tunnel, 12 ft. by 7 ft. 6 in., under the long axis of the storage silos. This tunnel has a total length of 800 ft. There are five gates under each silo and five gates under each open storage space, centered along the belt, with the material at each gate flowing over a lip that can be raised or lowered to control the flow of stone. These lips are slotted with a "V" so that the amount of material deposited on the belt will be thicker in the center of the belt and feather out toward the edges. The aggregates in storage, if desired, can be recombined on this belt.

Ground Storage Recovery—Washing Plant

That portion of the material in the ground storage piles between the silos, which will not flow to the tunnel belt, is thrown over the gates by a 15-ton Northwest crane mounted on crawler treads. The crane has an 80-ft. boom and a gooseneck on the end of the boom and uses a 1½-yd. dragline bucket.

The belt delivers the stone to the top of the No. 5, or washer building, and dis-

Building No. 5, containing the washer



Assembly plan and elevation of conveyor bridge for conveyors B, C and D

charges to a stationary washer. This consists of a series of inclined wire screens provided with chain baffles that break up and retard the flow of stone over these screens. As the crushed stone cascades over the stationary screens, water is sprayed from four 4-in. perforated pipes that are connected to an 8-in. header. Fresh water is pumped to the washer by a Cameron centrifugal pump having a capacity of 3000 gal. per min., at a hydrostatic pressure of 125 lb. per sq. in., at 160-ft. head. The pump is direct-connected to a 200-hp., 1750-r.p.m., Allis-Chalmers induction motor.

The fines or sand and wash water collect in a sump under the washer and are pumped to waste by an 8-in. Morris centrifugal pump that has a capacity of 2800 gal. per min. The sand pump is direct-connected to a 200-hp., 695-r.p.m., Allis-Chalmers induction motor.

Both the sand and fresh water pumps are mounted in a reinforced-concrete pit near the base of the washer building where provisions also have been made for installing extra sand and fresh water pumps in the future, should it become advisable to do so.

The sands and waste from the washer are pumped a distance of 2000 ft. south of the plant and 500 ft. east of the Hudson river to a settling basin covering an area of 10 acres. Here the suspended material is settled out and the clear water passes through a sluiceway back to the river.

The washer was designed by William Berry, master mechanic of the Tomkins Cove plant of the New York Trap Rock Corp. This type of washer has been in successful use for several years at other plants of the company.

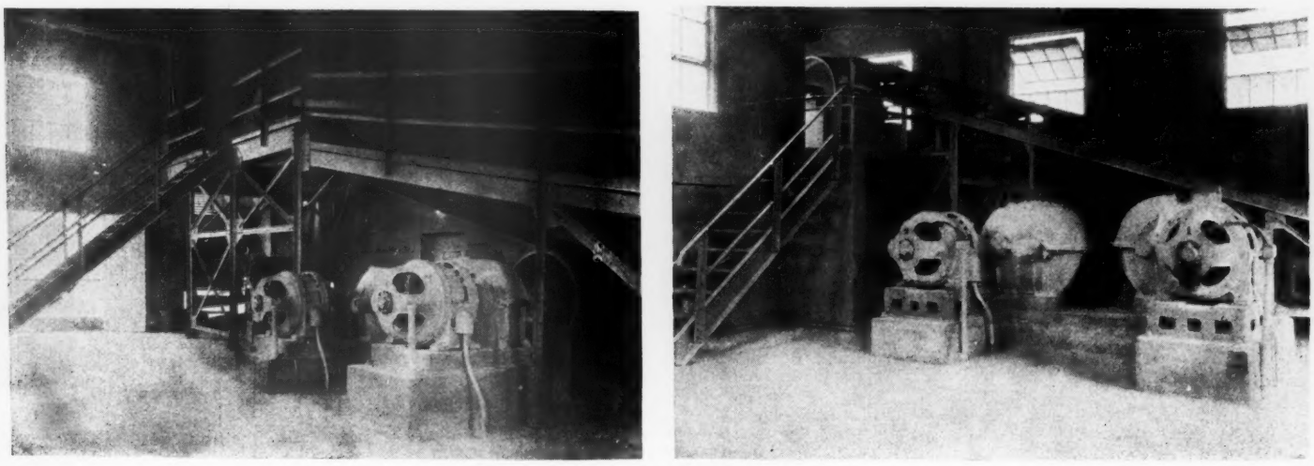
Barge Loading

After the stone has been washed it falls to belt *J*, a 48-in. belt conveyor that elevates and conveys the material to a point directly over the barges where, by means of a reciprocating Robins tripper, the barges are loaded evenly. At the time the barges are being loaded they are moved lengthwise from time to time by a barge mooring hoist. The entire loading operation is under the control of one man.

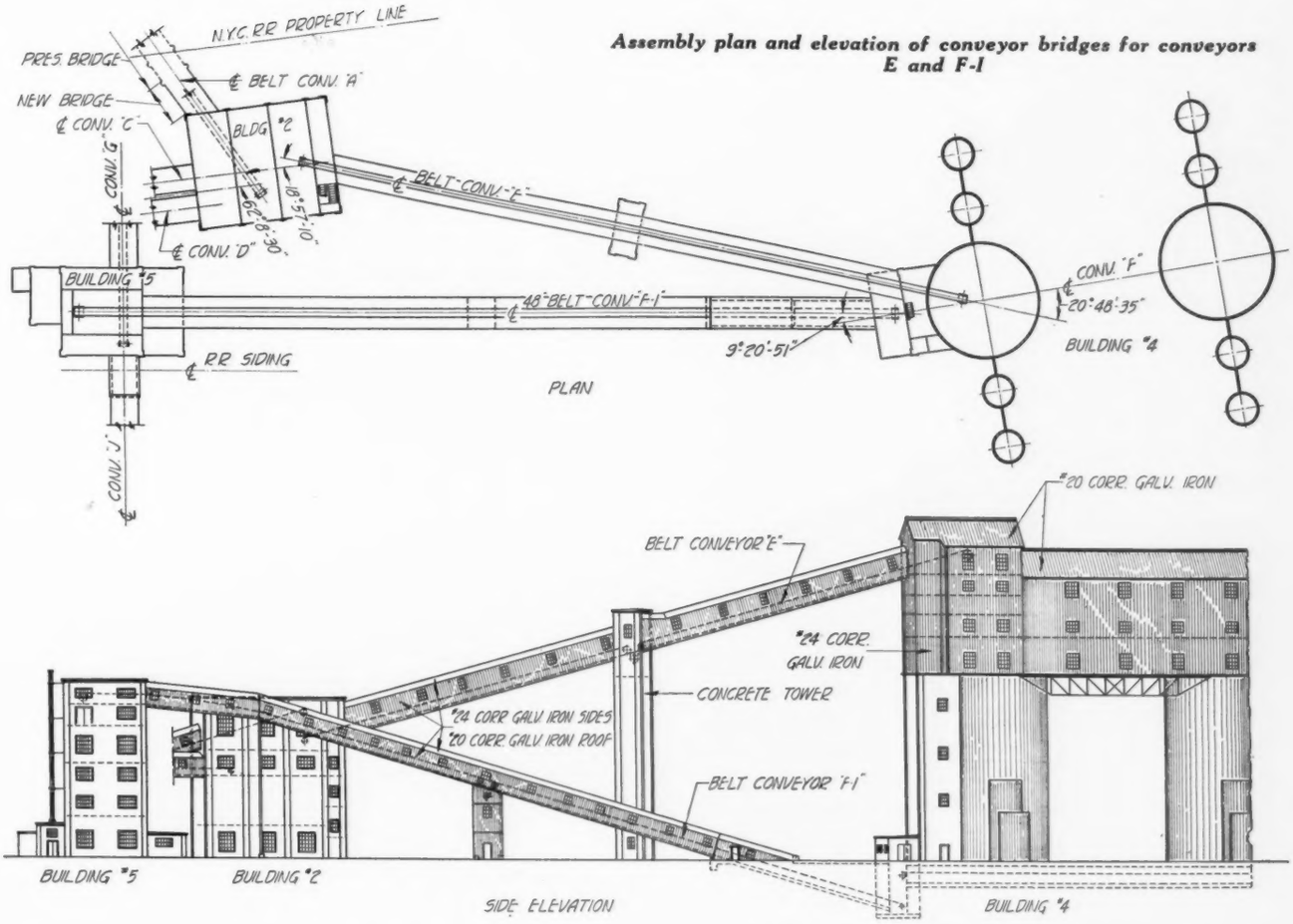
The gallery, containing the reciprocating mechanism used for loading, is 25 ft. above normal water lines. This height is adequate for loading of all barges but, in the event an ocean-going boat is loaded, means are provided for bypassing the tripper and discharging directly off the end of the belt through a separate chute. This chute can be swung laterally so as to spread the material in the hatches of the cargo boats.

Railway and Truck Shipments

Material intended for car or truck shipments is first washed in the same washer previously described and by a series of belt conveyors is sent to eight separate and distinct silos from those previously described. To be more specific, the belt conveyor *G* under the washer, being reversible, can discharge to conveyor *H*, that in turn serves conveyor *I*. This conveyor passes over the top of the eight silos, where it is unloaded by a Robins tripper.



Methods of belt conveyor drive



Assembly plan and elevation of conveyor bridges for conveyors E and F-1

These silos are 60 ft. high by 20 ft. 9 in. in diameter, and each holds 750 cu. yd. of washed stone. Provisions have been made for installing a mixing belt under these silos at some future time.

At one end of the building is a 20-ton truck scale and a 100-ton railroad track scale so arranged that the scale beams are in the shipping office and operated by one man. Loaded and empty cars at the silos are switched by a company-owned Vulcan gasoline locomotive.

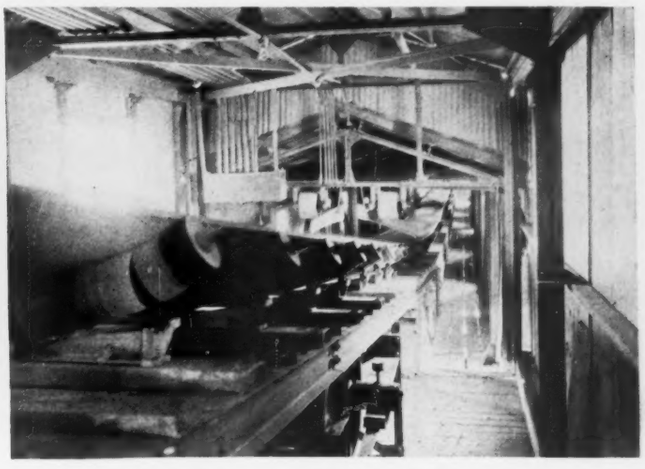
In No. 6 building is a boiler for supplying steam to heat the washer, during cold weather, and for heating the shops (building No. 7) as well.

Repair Shop—Power Supply

No. 7 building contains the office, store rooms, machine, blacksmith and electrical shops, as well as the air compressor. In the shop a 10-ton P. and H. crane travels the length of the store room, machine and blacksmith shops. A railroad siding also runs through the shops from the south end.

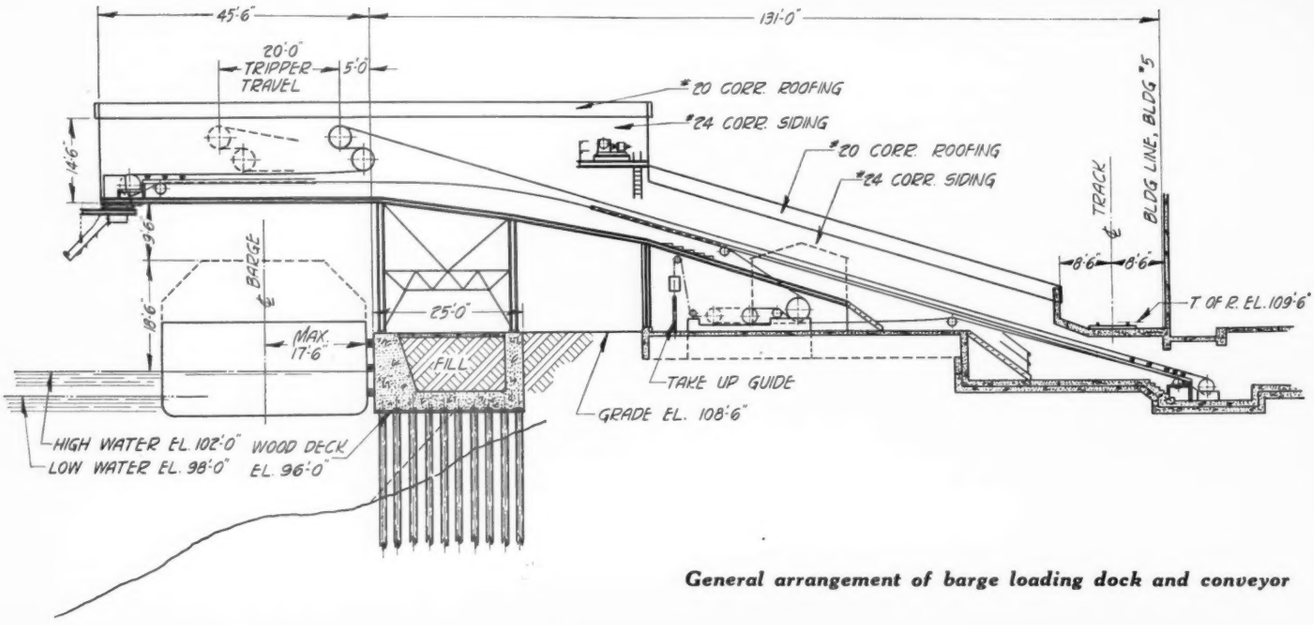
Power is furnished by the Central Hudson Gas and Electric Co. at 66,000-volts, 3-phase, 60-cycles, to the substation. Three banks of 3-phase, 1500-kv.a. transformers reduce the voltage to 2300 for distribution throughout the entire plant. There is a total connected load of 4500 hp. at the present time, which ultimately will be increased to 6000 hp. as the additional equipment referred to is installed. The substation is Westinghouse equipment, and the transformers are Allis-Chalmers. Motors up to and including 25 hp. are 440-v., and are supplied from distribution transformers located in

Conveyor galleries are steel and corrugated iron

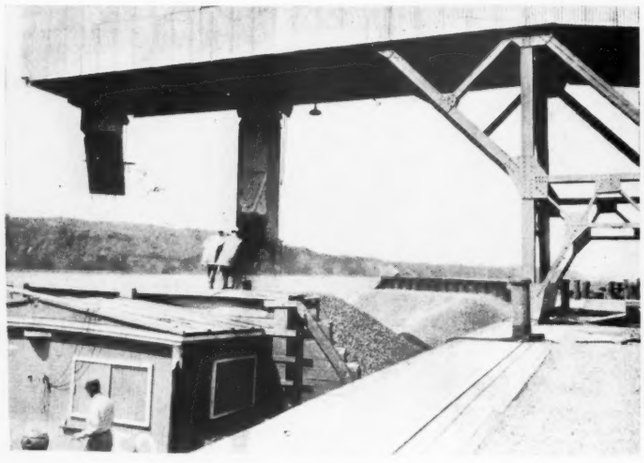


The 48-in. belt conveyor from primary crusher

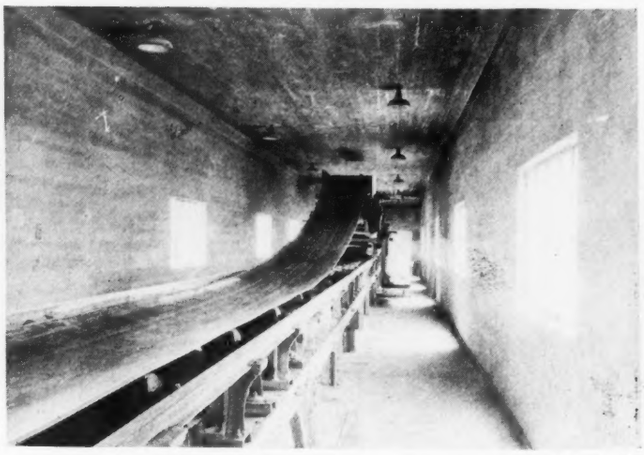
Loading crushed stone at the new Clinton Point plant



General arrangement of barge loading dock and conveyor



Loading barges; the vertical chute travels width of barge by a reciprocating tripper

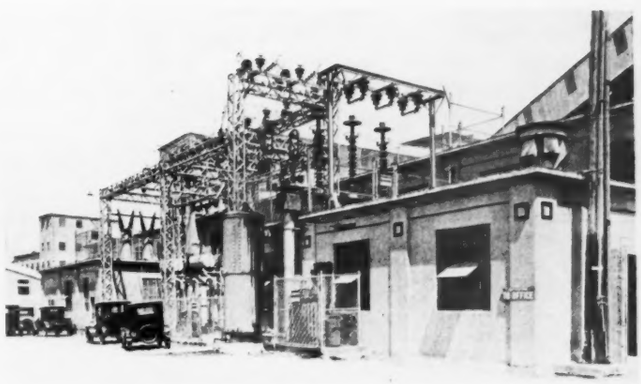


Tripper over silos used for car shipments and trucks

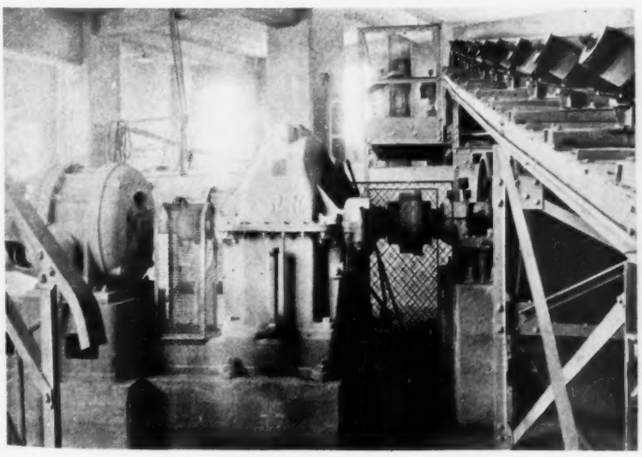
Eight silos for truck and rail shipments

Excess fines are hauled to the dump from this loading terminal

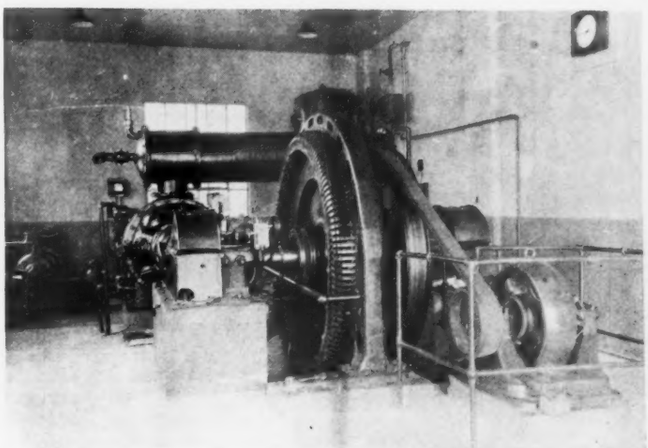
Plant offices are in this neat reinforced concrete building



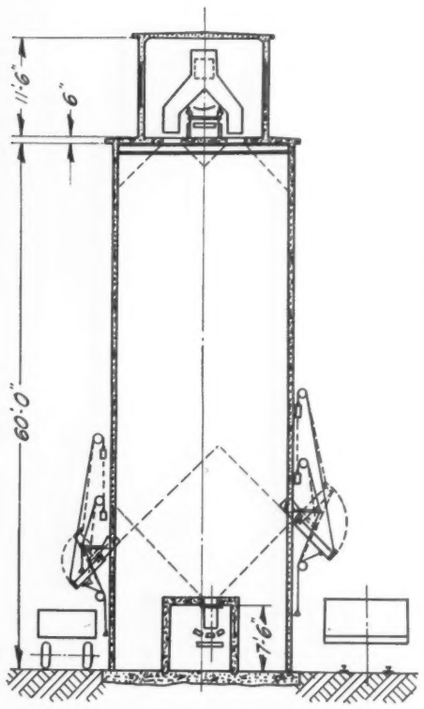
Compressor house adjoins substation at right



Method of drive for one belt conveyor



Water pump, compressor and synchronous motor



Section of one of the silos below

each building. All motors over 25 hp. are operated on 2300-v. current.

Air for secondary drilling or for general use about the plant is supplied by a Class PREZ, Ingersoll-Rand, 22-in. by 16-in., 14-in. by 16-in. compressor that is direct-connected to a Type ATI, Form E, 2200-volt, 60-cycle, 3-phase, General Electric synchronous motor.

In the same room with the compressor is a 6-in. De Laval centrifugal pump for supplying water for the compressor and other miscellaneous uses about the plant.

Personnel

The main offices of the New York Trap Rock Corp. are at 250 Park avenue, New York City. Sterling Tomkins is vice-president in charge of operations. The engineering and operating of all five plants of the company are directed from the Newburgh, N. Y., office, where E. Lee Heidenreich, chief engineer, is located.

Ray Coy is superintendent of the Clinton Point plant and John Flynn, quarry foreman.

Report of the Bureau of Standards

THE ANNUAL REPORT of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ending June 30, 1930, has been published as Miscellaneous Publication No. 115. This report contains 53 pages and covers in a condensed form the various activities and accomplishments of the Bureau during the past year.

During this time 106 research papers were published in the Bureau of Standards *Journal of Research*, with a total of 182 papers of all kinds, and about 240 papers were published in outside journals. More than 200,000 tests were completed, and 651 purchase specifications promulgated, while a large amount of research work was done along various lines. As a result of the standardization work of the bureau, simplified-practice recommendations covering 113 commodities have been adopted by the industries affected and it has been found that the adherence to such recommendations has been more than 85%.

In the field of lime, gypsum, cement, and other non-metallic minerals a large number of investigations and tests have been carried on.

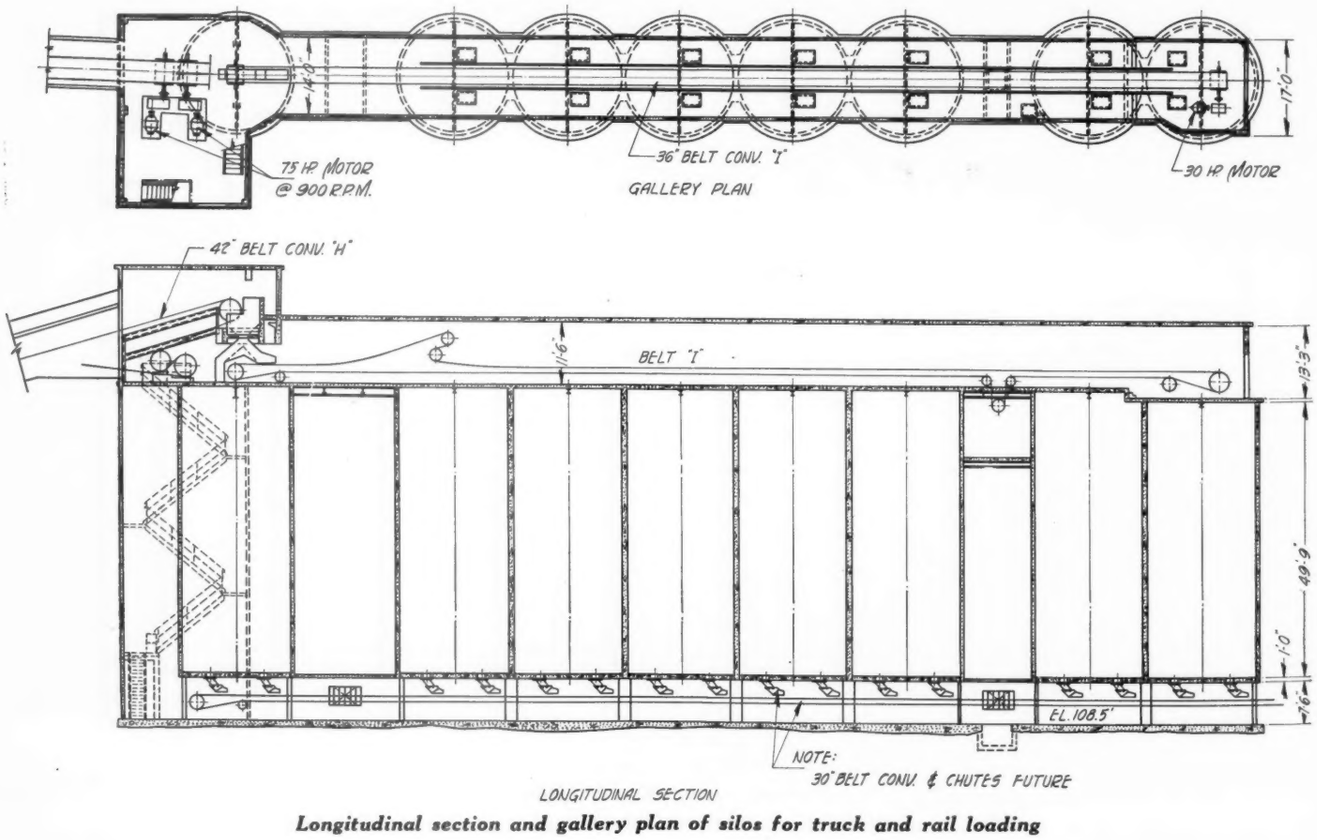
Copies of the report may be obtained, at a price of 10 cents each, from the Superintendent of Documents, Washington, D. C.

Coals of Ohio

INFORMATION on the coals of Ohio is contained in the Fourth Series, Bulletin 34, entitled "Analyses of Coals," by the State Geological Survey of Ohio, 1929.

This 360-page book brings together in one volume the more important facts regarding the different coal deposits of the state, such as analyses, heating value, uses, areas of deposits, and thickness of beds.

The Ohio coals are all bituminous and of Pennsylvanian age with a few exceptions, varying, though not greatly, in composition. The 1928 production was approximately 15,000,000 tons. About 52 beds have been recognized and named; about 16 are mined for railroad shipment, while some 16 others have been worked for local consumption.



Longitudinal section and gallery plan of silos for truck and rail loading

Increased Recoveries of Phosphate in Land-Pebble District of Florida

THE RESULTS of laboratory investigations to determine to what extent gravity methods of concentration might be applied to those low-grade sands now being wasted at some Florida phosphate rock plants are given in Report of Investigations No. 3018, July, 1930, by H. M. Lawrence and R. G. O'Meara of the U. S. Bureau of Mines.

The information given includes screen tests and analyses showing the distribution of bone phosphate of lime (B.P.L.) in the various screen sizes from 8-mesh to 200-mesh, the corresponding results after classifying, and again after table concentration. The samples tested were from the land-pebble district in Polk and Hillsborough counties, Florida, and the concentration consisted in first classifying them in a six-spigot hydraulic classifier and then concentrating them over a 3-ft. by 7-ft. table. The recoveries obtained were sufficient to justify commercial consideration and ranged from 35% to 45% of the phosphate content of the sands treated. Tabling subsequent to classification gave worth-while additional recoveries over the hydraulic classification. It should be noted that the concentration was largely a sizing action, as there is but little difference in the specific gravities of sand and phosphate grains, but that both classifier and table were effective as sizers.

Report of Investigations No. 3023, July, 1930, by H. M. Lawrence, U. S. Bureau of Mines, also brings out the improvements and changes which have been made in washing practice at these plants, resulting in recoveries averaging 6% greater than previously. It is shown that these have been obtained largely by retreating the overflows and maintaining better control over the washing operations, and by the more careful retreatment of the commercial fractions or plus 20-mesh pebbles. The increased use of mechanical sampling devices to obtain more reliable samples at the different stages, and the deductions from these sampling results, have also played their part in effecting more economical recovery.

New A. S. T. M. Tentative Standards

THE 1930 EDITION of the A. S. T. M. Tentative Standards has just been issued by the American Society for Testing Materials. These "tentative standards" are proposed standards which are published for one or more years in order to bring out any criticism before formally adopting them as standards. Criticism of them is given consideration by the committee concerned before recommending final adoption.

The volume contains 864 pages and 155 tentative standards, of which 41 have to do with cement, lime, gypsum and clay products, and road and paving materials.

The standards and tentative standards of the society are recognized as authoritative in the field of engineering materials.

Copies of the volume are obtainable from the headquarters of the society at 1315 Spruce St., Philadelphia, Penn.

Mineral Resources of New Mexico

AN OUTLINE of the mineral resources of New Mexico has been prepared by E. H. Wells, president and director of the state bureau of mines and mineral resources of the New Mexico School of Mines, Socorro, N. M., giving information and statistics on the state's mineral wealth.

From this outline it appears that in addition to the production of metallic minerals there are important deposits of nonmetallic minerals awaiting development. The most important of these is stated to be the potash-bearing polyhalite upon which some work has been started, and the unusually pure gypsum deposits underlying a large part of the state.

Also in addition to an abundance of sand and gravel, and numerous deposits of limestones and clays, are feldspar, fluorspar, bentonite and such ornamental stones as marble, granite, red sandstone, onyx, jasper, so-called ricolite and petrified wood. These deposits are widely distributed throughout the state. For 1929 the total value of the mineral products was about $37,000,000, of which about $1,500,000 was for the nonmetallic minerals.

New Lighting Code

A REVISED "Code for Lighting Factories, Mills and Other Work Places" has been published by the American Standards Association. This code, which applies to practically all industries and has been developed and approved by the various member engineering societies of the association as well as various governmental departments, is intended as a guide for factory owners and operators in their efforts to improve lighting conditions in their factories, and also as a source of authoritative information for bodies preparing safety regulations. It contains sections on measurement of illumination, avoidance of glare, specifications of adequate wiring, locating switches, and a suggested minimum regulation to be established by state authorities, and should be of value to those concerned with factory operation.

Through increased production, improved quality of goods and reduction of accidents, good lighting plays a very important part in industrial economy, and at present low costs of providing adequate illumination it may be easily shown that a good lighting system will pay for itself many times over.

The code may be obtained from the American Standards Association, 29 West Thirty-ninth St., New York City.

New Products Made from Gypsum

SEVERAL NEW PRODUCTS consisting primarily of gypsum were introduced during 1929 and may lead to an increasing use of this material, according to the United States Bureau of Mines, Department of Commerce. An extremely hard dense plaster, suited primarily for architectural casting, was recently placed on the market. On the West Coast producers of gypsum products have developed a wall board that may be bent or folded to conform to structural needs. Gypsum lath that folds and is more or less flexible so as to simplify its application to intricately designed interior structures was also a new development. A new method for fastening wall board and lath to steel structural members was devised. Considerable research work was done to develop acoustical wall boards, and gypsum acoustical ducts that prevent the transmission of sound through ventilator shafts were placed on the market. Some companies are now producing artificial travertine, using gypsum as the principal material.

A process was patented for casting concrete objects in porous plaster molds. The plaster molds absorb a considerable portion of the water in the concrete mixture, resulting in a concrete object of great strength.

The manufacture of white cements having excellent cementing properties from anhydrite is receiving considerable attention and points the way to the economical use of enormous tonnages of material now considered waste. Cements made by patented processes develop strengths of 500 to 550 lb. in 24 days and 800 lb. in 28 days and are hard enough to take a high polish. It is said that they can be calcined at fuel costs comparable with present practices in calcining ordinary gypsum.

In the Middle West and East the manufacture of gypsum lumber made considerable progress during the year, and it is reported the future of this product is promising.

Statistical data regarding the gypsum industry is contained in the Bureau of Mines report, "Gypsum in 1929," by R. M. Santmyers and Jefferson Middleton, which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 5 cents.

Construction Division Engineer of Lime Association Resigns

C. E. ELLSWORTH, C. E., has resigned as chief engineer of the construction division of the National Lime Association, Washington, D. C. Previous to his connection with the National Lime Association, Mr. Ellsworth held the following positions: secretary-treasurer of the Rice-Jones Co. (general contractors); chief of staff of Warren D. Spangler, Inc. (power plant engineers), and assistant chief engineer of the Gulf Refining Co. (petroleum refiners).

Further Developments in Closed-Circuit Dry Grinding

Supplementing the Article on Closed-Circuit Dry Grinding by the Writer, Published in Rock Products, July 19, 1930

By H. G. Wright
Hardinge Co., New York City

IT HAS BEEN STATED at one cement plant where the Hardinge reverse current system of air classification is in use for the preparation of raw material, that a definite increase in the output from the kilns was apparent. It is believed that this should be a fact for two reasons: In the first place, the absence of coarse oversize in the material prepared in this system should give more output per unit of heat because of the fact that more heat is required to bring about complete combination of coarse particles than fine.

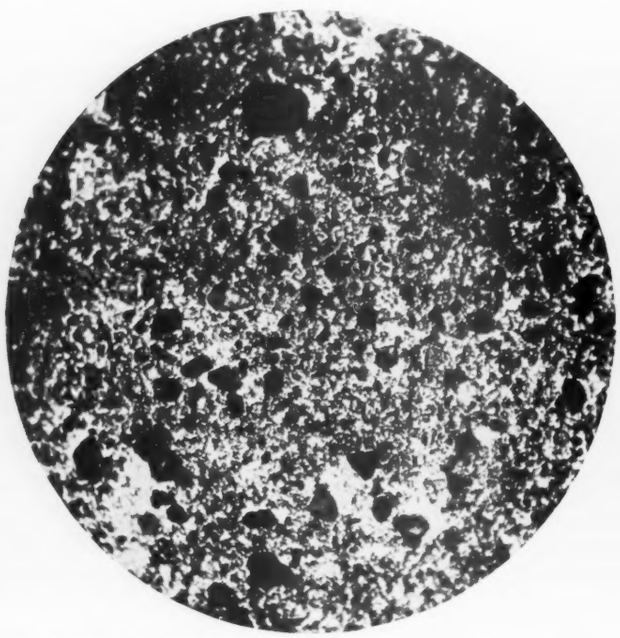
The following sentence is taken from a paper by Dr. R. H. Bogue, entitled "The Influence of Fineness of Raw Materials on the Burning of Portland Cement," and has bearing, it would seem, on the shape of the particles. The sentence referred to is: "The size distribution affects the rate of reaction by determining the distance between the reacting grains, that is, the intimacy of contact." A collection of grain particles all of which are spherical in shape will give a minimum of surface in contact and the reverse current system of removal of fines from a mill shortens the time that the material is in the mill and thereby produces particles of sharp and irregular shapes. These particles, being less rounded in shape than those from a gravity discharge mill should produce more grain surface in contact and therefore should increase the kiln output per unit of heat consumed.

In the same paper as cited above, Dr. Bogue states that "since a small amount of free lime in the clinker would produce a relatively large amount of tricalcium silicate if combined and since tricalcium silicate is believed to be responsible for strength at early ages, it is probable that early strength is sacrificed by the incomplete combination." Therefore, raw material prepared by the method under discussion should produce a cement of higher early strength than that prepared by other methods, due to the formation of higher percentages of tricalcium silicate by more complete combination in the kiln. It is assumed that the burning would be identical and the clinker be ground to the same fineness in both cases, as these two factors also affect the early strength of the resulting cement.

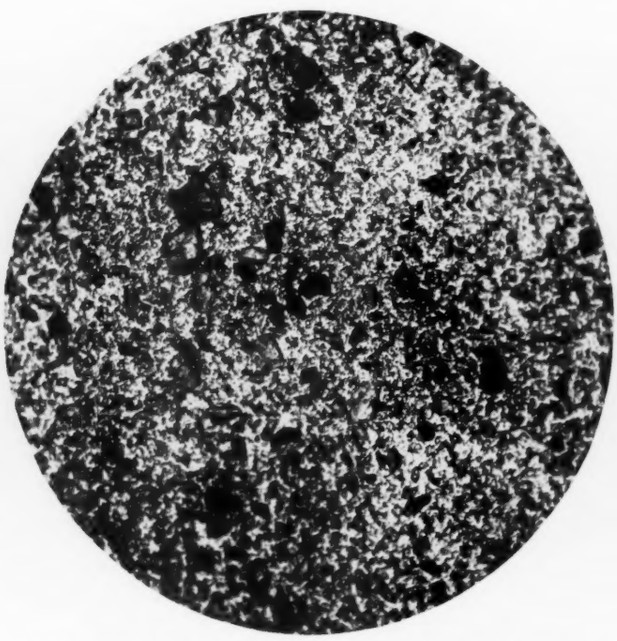
Another characteristic of the raw materiai referred to which tends to improve the quality of the resulting cement is the practical elimination of coarse oversize particles. These coarse particles when they are present in the raw material go through the kiln in an uncombined state and act as a diluent in the cement. It is believed that an additional benefit will be found to exist from closed-circuit grinding, both dry and wet, and that is a lessening of the losses carried out by the flue gases, due to the low flour content of the raw material fed to the kilns when prepared in a closed-circuit system.

Desirable Size of Raw Materials

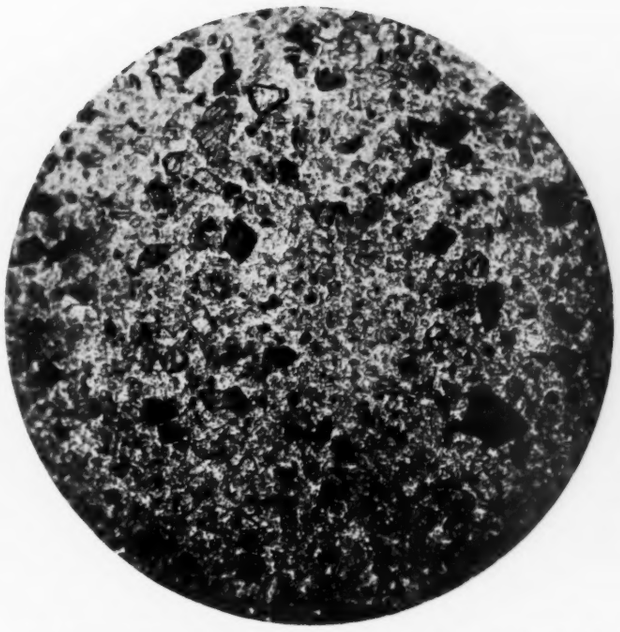
The desirable size range for a raw material of a limestone-clay mix seems to lie between 150-mesh and 1280-mesh. To make a product as near as possible within this range requires some control over the material while it is being ground. There is no control of a material fed to a tube or compartment mill from the time it is delivered



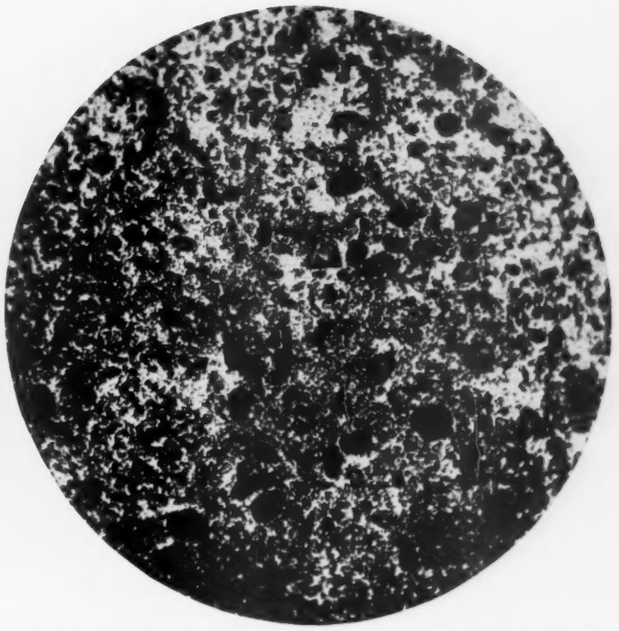
High-speed, screen-mill product; character of particles lies between reverse current air classified and tube-mill particles. Magnified 50 dia. Raw limeston mix



Air classified product reverse current system of air classification. Magnified 50 dia. Less crystalline calcite. Note sharp particles. Raw limestone mix—amorphous character



Air classified product reverse current system of air classification. Magnified 50 dia. Note the sharp contour of particles and absence of pebbles. Raw limestone mix containing much crystalline calcite



Tube-mill gravity discharge product. Magnified 50 dia. Note the large number of rounded pebble-like particles. Raw limestone mix

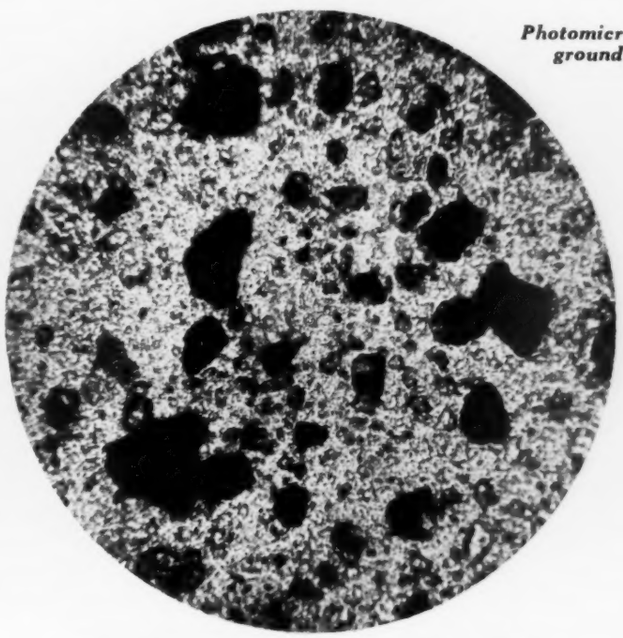
to the mill until it is discharged from it. Closed-circuit grinding gives the nearest approach to control that we know of; and in the case of dry grinding, the reversed current system of closed-circuit grinding as applied to the conical ball mill permits the operator to control his product to a considerably greater degree than is the case in open-circuit grinding.

In the cement industry, the washed clay used in a large percentage of raw mixes is largely finished material, as far as the necessary fineness is concerned, and is added to the raw material feed ahead of the raw mills. This finished material will be removed from the mill very quickly in the reversed current system and thus eliminate some of the cushioning which takes place in the longer types of gravity discharge mills. The average raw material mix when crushed so all passes a ¼-in. round opening will contain approximately 20% of minus 200-mesh fines. This finished material is also removed from the mill very soon after entering, which means that this type of unit can be operated at a minimum of wasted power due to cushioning by fines. The photomicrographs shown herewith bring out the more rounded shape of the particles in the case of the gravity discharge product as compared to that from the reverse current system.

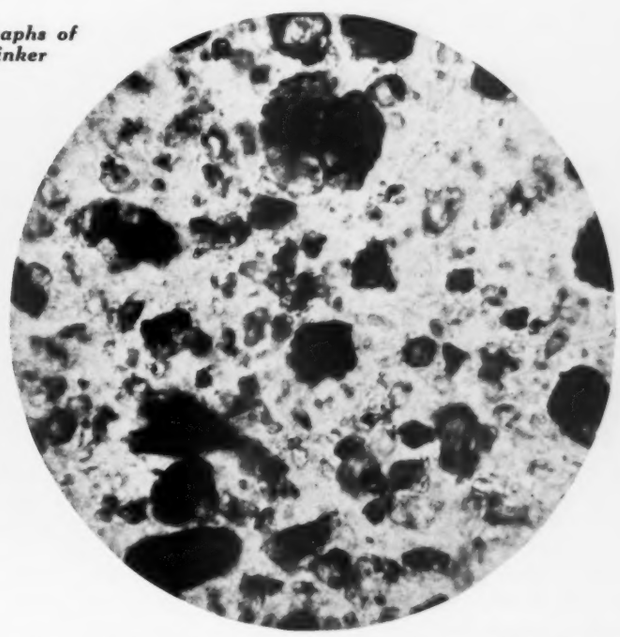
The photomicrograph of a high-speed-mill product shows characteristics between the air classified and the gravity discharge tube-mill products. This would be expected as the material is retained in this type of mill for a longer period than in the reversed current system but not as long as in a long tube type of mill.

The screen analyses of the four samples from which the photomicrographs were

Photomicrographs of ground clinker

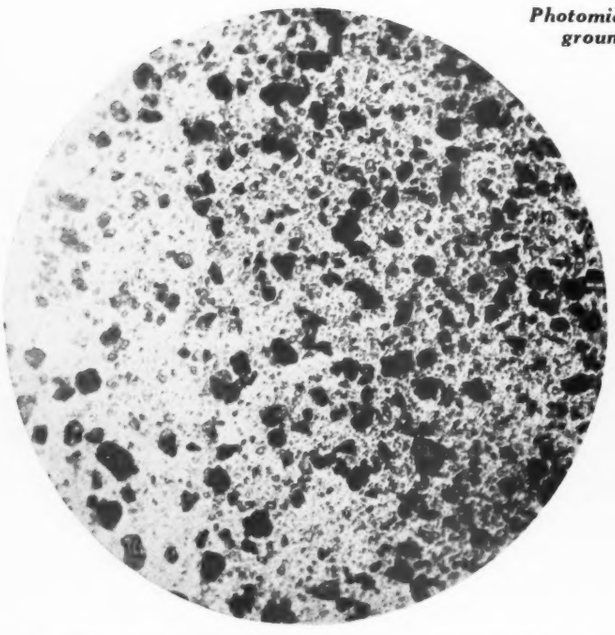


Tube-mill, gravity discharge, magnified 160 dia.

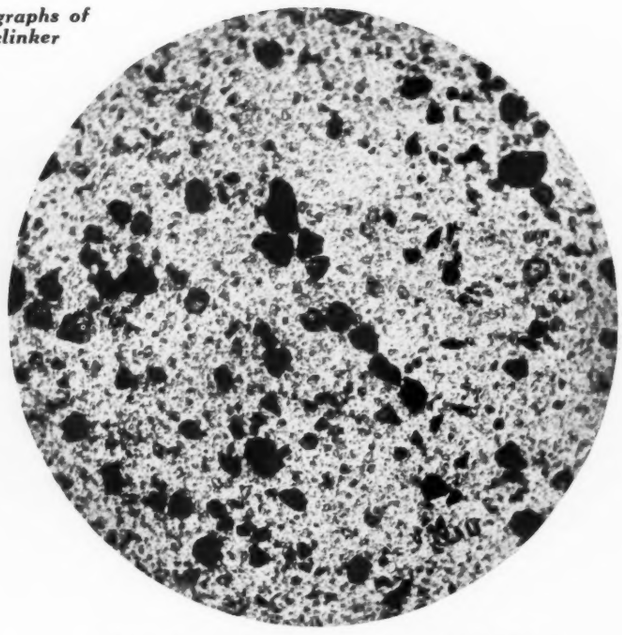


Reversed-current system, air classification, magnified 160 dia.

Photomicrographs of ground clinker



Reversed-current system, air classification, magnified 50 dia. Note excellent classification



Tube-mill, gravity discharge, magnified 50 dia.

made in the table at the bottom of page.

These analyses accentuate the fact that the air classified material carries less oversize than the other two products. This is evidenced by the fact that the tube-mill product at 92.1% minus 200-mesh shows 98.6% minus 100-mesh, while the product from the reversed current system at 90.4% minus 200-mesh gives 99.3% minus 100-mesh.

Effect on Burning

It has been fairly well established that extreme finenesses of the raw material do not aid the process of burning to a sufficient degree to justify the much increased cost of grinding. On the other hand, particles which are plus 100-mesh in size do not combine readily in the kiln. Results of actual burns demonstrating the effect of raw finenesses on kiln operation follow and show the effect of increased amounts of 100-mesh material:

Pct. minus 100-mesh	Pct. minus 200-mesh	B. t. u. per Barrel	
99.03	95.66	1,492,702	Moisture=32.89%
97.30	91.84	1,672,770	Moisture=32.55%

At one plant the reversed current system gives 99.47% minus 100-mesh when grinding to 91.5% minus 200-mesh, while at another plant this system shows 98.95% minus 100-mesh when grinding to 87.45% minus 200-mesh. The degree of fineness to which a given raw material must be ground for most efficient burning should be determined for each individual case, as rocks which approach a natural cement rock will not require the fineness of grind of a limestone-clay mix. Where silica is present in the form of quartz, the mix will require finer grinding to insure sufficient fineness of this substance, as it reduces more slowly than the remainder of the material in the mill due to its hardness.

Clinker Grinding

The reversed current system of air classification as applied to the conical ball mill lends itself successfully to the grinding of clinker and is in use for this purpose. The advantages to be had with this unit are lack of excessive heating and absolute control over the fineness of the product through very simple adjustments. As is the case when grinding raw material, repairs are almost nil, and ball and lining wear nominal.

The tensile and compressive strengths, except the 24-hour, of cements prepared in the unit under discussion seem to be consistently higher than cement prepared from the same clinker when ground to the same fineness at 200-mesh in other types of mills. This should be a fact, as the increased surface in contact, due to the more angular shape of the particles, would give more complete reactions during the hydration of the cement. The particles in a cement which are finer than a 10-micron size probably hydrate so rapidly that they are spent before the mixing of the mortar is completed, thereby losing much of their efficacy as cement. Therefore, a grinding system which allows a sufficient control over particle sizes to hold them in the range between 150-mesh and 10-micron should give a better cement than mills which form large quantities of sub-10-micron size and some plus 150-mesh oversize.

The slides of cement for the photomicrographs shown herewith were made up only in oil and do not show the particles in as clean cut a fashion as those of raw material prepared in water.

Comparison Shows Interesting Results

Preparation of the cement slides in water was not attempted because of the setting qualities of the cement. However, a comparison of the two sets of photos does show the absence of coarse oversize in the cement ground in the unit employing the reversed-current system, and also shows in general a more angular grain in that product, especially in the finer sized grains. This latter characteristic of the angular grain should tend to produce a better cement. This would be due to the fact that there would be more surface in contact in the case of the cement made with the reversed-current system than with cement which has been ground by other methods.

Los Angeles County Minerals

CALIFORNIA'S mineral production for 1929 is valued at $432,248,228. Los Angeles county accounted for $243,568,275.

SCREEN ANALYSES OF FOUR SAMPLES OF RAW MATERIAL

Type of Equipment	Per cent. minus 200-mesh	Per cent. minus 140-mesh	Per cent. minus 100-mesh	Per cent. minus 65-mesh	Per cent. minus 48-mesh	Per cent. plus 48-mesh	Per cent. minus 40-mesh
Tube mill, gravity discharge	92.1	97.8	98.6	99.6	99.7	.....	.....
Air classified, reverse current system	90.4	98.4	99.3	99.9	.....	Tr.	
Air classified, reverse current system	88.9	97.4	98.3	99.7	99.9	.....	.....
High-speed mill	85.6	91.2	95.4	99.7	.....	.....	100.0

Researches on the Rotary Kiln in Cement Manufacture*

Part X—Calculation of the Quantity of Heat That Is Absorbed in Making 1 Lb. of Portland Cement Clinker

By Geoffrey Martin

D.Sc. (London and Bristol), Ph.D., F.I.C., F.C.S., M. Inst. Chem. Eng., M. Inst. Struct. Eng., M. Soc. Pub. Analysts, F. Inst. Fuels; Chemical Engineer and Consultant; Former Director of Research of the British Portland Cement Research Association; Author of "Chemical Engineering"

Calculation of the Quantity of Pure Dry Raw Material Required to Make 100 Lb. of Portland Cement Clinker

Assume for portland cement clinker the following composition:

Calcium oxide, CaO	64.00
Alumina, Al_2O_3	7.00
Ferric oxide, Fe_2O_3	3.00
Silica, SiO_2	22.00
Other non-essential ingredients	4.00
	100.00

Omitting the unessential ingredients, the clinker would reduce to the following composition:

$CaO = 66.27$ lb.
$Al_2O_3 = 7.29$ lb.
$Fe_2O_3 = 3.12$ lb.
$SiO_2 = 22.92$ lb.

100.00 lb.

We will take this *simplified clinker* as the basis for our calculations in the following pages.

The dried slurry required to produce 100 lb. of this clinker will have the following composition:

Calcium carbonate, $CaCO_3$	119.05 lb.	66.67 lb. CaO 52.38 lb. CO_2	
Kaolin, $Al_2Si_2O_7 2H_2O$	18.46 lb.	7.29 lb. Al_2O_3 8.60 lb. SiO_2 2.57 lb. H_2O	
Hydrated silica (93% SiO_2, 7% H_2O)	15.40 lb.	1.08 lb. H_2O 14.32 lb. SiO_2	
Ferric oxide, Fe_2O_3	3.12 lb.		
Total	156.03 lb.	containing	66.67 lb. CaO 52.38 lb. CO_2 7.29 lb. Al_2O_3 22.92 lb. SiO_2 3.65 lb. H_2O 3.12 lb. Fe_2O_3

The dried slurry on ignition will lose 35.9%.

Calculation of the Minimum Quantity of Heat Which Must Be Liberated Below 805 Deg. C. (1481 Deg. F.) in Order to Make 100 Lb. of Clinker

In order to make 100 lb. of clinker we must start with

(*a*)	$CaCO_3$	119.05 lb.
(*b*)	Kaolin	18.46 lb.
(*c*)	Hydrated silica	15.40 lb.
(*d*)	Ferric oxide	3.12 lb.

Assume that the initial temperature is 60 deg. F. (15.6 deg. C.)

(a) Calcium Carbonate—The mean specific heat of $CaCO_3$ between 16 deg. and 805 deg. C. is 0.267.†

Hence the quantity of heat in *British thermal units* required to raise 119.05 lb. of $CaCO_3$ from 60 deg. F. (15.6 deg. C.) to 1481 deg. F. (805 deg. C.) is

$$119.05 \times 0.267 \times 1421 = 45{,}168 \text{ B.t.u.}$$

(b) Kaolin—The mean specific heat of *kaolin* between 20 deg. C. (68 deg. F.) and 98 deg. C. (208.4 deg. F.) is given by Ulrich as 0.224.‡ It certainly will be greater than this at higher temperatures because specific heats increase with the temperature; also the kaolin decomposes between 400 deg. and 800 deg. C. According to Mellor and Holdcroft,¶ the quantity of heat required to dehydrate 1 lb. of *kaolin* is 75.5 B.t.u. After dehydrating, kaolin is supposed to be decomposed between 450 deg. C. (842 deg. F.) and 900 deg. C. (1652 deg. F.) into a mixture of alumina, Al_2O_3, and silica, SiO_2.

One lb. of kaolin, $Al_2Si_2O_7 2H_2O$, contains 0.1391 lb. H_2O; 0.3949 lb. Al_2O_3; 0.4660 lb. SiO_2.

Hence we may proceed as follows:

(1) Calculate the amount of heat required to dehydrate 1 lb. of kaolin at 60 deg. F. Assume this to be 75.5 B.t.u. per 1 lb. of kaolin.

(2) After dehydrating the 1 lb. of kaolin we have left 0.3949 lb. of Al_2O_3; 0.4660 lb. of SiO_2, and 0.1391 lb. of water.

We must then calculate the quantity of heat required to raise these materials from 60 deg. F. (15.6 deg. C.) to 1481 deg. F. (805 deg. C.).§ The total will be the quantity of heat required to raise 1 lb. of clay to 805 deg. C. (1481 deg. F.).

To make this calculation we require the mean specific heat of SiO_2 and Al_2O_3 between ordinary temperatures and 805 deg. C. (1481 deg. F.). According to Richards,* the mean specific heat S_m of Al_2O_3 between 0 deg. and t deg. C. is given by the formula

$$S_m = 0.2081 + 0.0000876t.$$

Substituting $t = 805$ deg., we obtain for the mean specific heat of Al_2O_3 between 0 deg. and 805 deg. C.

$$= 2.2081 + 0.0000876 \times 805$$
$$= 0.2081 + 0.0705$$
$$= 0.2786.$$

Hence the quantity of heat required to raise 0.3949 Al_2O_3 from 60 deg. F. (15.6 deg. C.) to 1481 deg. F. (805 deg. C.) is

$$0.3949 \times 0.2786 \times 1421$$
$$= 0.11001914 \times 1421$$
$$= 156.337 \text{ B.t.u.}$$

Editor's Note

STARTING with sufficient slurry to produce 100 lb. of cement clinker, Dr. Martin follows this through the kiln, calculating the heat absorbed by each component material at the various stages of the sintering process. The result shows heat absorption for the period below 1481 deg. F. and also for the period above that temperature. It takes no account of the quantity of heat recoverable from the hot clinker and evolved gases, as this will be taken up in a later article.

A break will be necessary in the continuity of Dr. Martin's series in order to give us sufficient space in our issue of January 3 for annual review material. His next article will appear in the issue of January 17.

†By interpolation from Magnus' "Determinations of the Specific Heat of Calcium Carbonate." See *A. Magnus, Ann. d. Phys.*, 1910, **31** (4), 597; *Phys. Zeits.*, 1913, **14**, 5.

‡*Ulrich, Wollny Forsch. a. d. Geb. d. Agriculturphys.*, 1894, **17**, 1.

¶*Mellor* and *Holdcroft*, "Collected Papers from the County Pottery Laboratory, Staffordshire," vol. i., p. 277 (Griffin, London, 1914).

§Clay takes about thirty minutes to dehydrate at 800 deg. C. Only a small amount of water vapor escapes in thirty minutes at 500 deg. C., so that the assumption that the whole of the water vapor is raised to 805 deg. C. before it escapes will not cause a serious error.

**J. W. Richards*, "Metallurgical Calculations," 1917, *part i.*, p. 123.

Also according to Richards (*loc. cit.*), the mean specific heat S_m of SiO_2 between 0 deg. and t deg. C. is given by the formula

$$S_m = 0.1833 + 0.000077t.$$

Substituting t = 805 deg. C.,

$$S_m = 0.1833 + 0.0620 = 0.2453.$$

Hence the quantity of heat required to raise 0.4660 lb. of SiO_2 from 60 deg. F. (15.5 deg. C.) to 1481 deg. F. (805 deg. C.) is $0.4660 \times 0.2453 \times 1421 = 162.434$ B.t.u.

As regards the combined water (0.1391 lb.) in the kaolin, we assume that this is (1) separated in liquid form from the kaolin at 60 deg. F. (15.6 deg. C.); (2) heated to 212 deg. F.; (3) turned into vapor at 212 deg. F., and (4) the temperature of the vapor increased from 212 deg. F. (100 deg. C.) to 1481 deg. F. (805 deg. C.).

(1) To separate 0.1391 lb. of water from the kaolin at 60 deg. F. (15.6 deg. C.) is assumed to absorb 75.5 B.t.u.

(2) To raise 0.1391 lb. of water from 60 deg. to 212 deg. F. requires

$$0.1391 \times 152 = 21.1 \text{ B.t.u.}$$

(3) To gasify 0.1391 lb. of water at 212 deg. F. under atmospheric pressure requires

$$0.1391 \times 970.7 = 135.0 \text{ B.t.u.}$$

(4) From the B.P.C.R. Association tables the amount of heat in B.t.u. required to raise 1 lb. of water vapor from 212 deg. F. (100 deg. C.) to 1481 deg. F. (805 deg. C.) is

$$696.2 - 84.2 = 612.0 \text{ B.t.u.}$$

Hence the quantity of heat to raise 0.1391 lb. through the same range of temperature is

$$0.1391 \times 612 = 85.1 \text{ B.t.u.}$$

Hence the total quantity of heat required to dehydrate 1 lb. of kaolin and raise it from 60 deg. F. (15.6 deg. C.) to 1481 deg. F. (805 deg. C.) is

$$156.3 + 162.4 + 75.5 + 21.1 + 85.1 + 135.0 = 635.4 \text{ B.t.u.}$$

But to make 100 lb. of clinker it is necessary to heat 18.46 lb. of *kaolin* from 60 deg. F. (15.5 deg. C.) to 1481 deg. F. (805 deg. C.) in order to bring it to the temperature at which the $CaCO_3$ decomposes.

Hence the total quantity of heat required for this operation is

$$18.46 \times 635.4 = 11{,}729 \text{ B.t.u.}$$

(c) Hydrated Silica—There are 15.40 lb. of hydrated silica (consisting of 14.32 lb. of SiO_2 united to 1.08 lb. of water), which is to be heated from 60 deg. F. (15.6 deg. C.) to 1481 deg. F. (805 deg. C.).

Here again we will proceed by assuming:

(1) That the silica is dehydrated at 60 deg. F. (15.6 deg. C.).

(2) That the resulting water is then heated from 60 deg. F. (15.6 deg. C.) to 212 deg. F. (100 deg. C.).

(3) The water is turned into vapor at 212 deg. F. (100 deg. C.).

(4) The vapor is then heated from 212 deg. F. (100 deg. C.) to 752 deg. F. (400 deg. C.).

(5) The silica is heated from 60 deg. F. (15.6 deg. C.) to 1481 deg. F. (805 deg. C.), the latter being the temperature at which the silica is completely dehydrated.

(1) The literature and known data relating to the dehydration of silica acids is given in the "Progress Report for the Three Months Ending March 31, 1923," of the British Portland Cement Research, p. 57.

The quantity of heat required to dehydrate 1 lb. of the hydrated silica is unknown. Seeing, however, that the dehydration is complete at 400 deg. C. against 800 deg. C. for kaolin, we will assume, in order to obtain a working figure, that the quantity of heat required for this purpose is only one-third that required to dehydrate an equal weight of clay.

To *dehydrate* 1 lb. of kaolin requires 75.5 B.t.u. Hence, to dehydrate 1 lb. of our hydrated silica will require 25.2 B.t.u.

(2) The amount of heat required to heat the separated water in 1 lb. of the hydrated silica (0.07 lb.) from 60 deg. to 212 deg. F. is $0.07 \times 152 = 10.6$ B.t.u.

(3) Amount of heat required to change 0.07 lb. of water into steam at 212 deg. F. and atmospheric pressure is

$$0.07 \times 970.7 = 79.5 \text{ B.t.u.}$$

(4) The amount of heat required to raise 1 lb. of steam from 212 deg. F. (100 deg. C.) to 752 deg. F. (400 deg. C.) is from the B.P.C.R. Association tables:

$$336.3 - 84.3 = 252 \text{ B.t.u.}$$

Hence the amount required for 0.07 lb. is

$$252 \times 0.07 = 17.64 \text{ B.t.u.}$$

(5) The amount of heat required to raise 0.93 lb. of silica, SiO_2, from 60 deg. F. (15.6 deg. C.) to 1481 deg. F. (805 deg. C.) is

$$0.93 \times 0.2453 \times 1421 = 324.2 \text{ B.t.u.}$$

Hence the total amount of heat required to dehydrate 1 lb. of hydrated silica and raise its temperature from 60 deg. F. (15.6 deg. C.) to 1481 deg. F. (805 deg. C.) is

$$25.2 + 10.6 + 79.5 + 17.6 + 324.2 = 457.1 \text{ B.t.u.}$$

But to make 100 lb. of clinker we must treat in this manner 15.40 lb. of hydrated silica.

Hence the total amount of heat required for this operation is

$$15.40 \times 457.1 = 7039 \text{ B.t.u.}$$

(d) Ferric Oxide, Fe_2O_3—In making 100 lb. of clinker, 3.12 lb. of ferric oxide, Fe_2O_3, are to be heated from 60 deg. F. (15.6 deg. C.) to 1481 deg. F. (805 deg. C.).

According to J. W. Richards ("Metallurgical Calculations," 1917, part i., p. 125), the *mean specific heat* of ferric oxide, Fe_2O_3, between 0 deg. and t deg. C. is given by the formula

$$S_m = 0.1456 + 0.000188t.$$

Substituting t = 805 deg. C., we get for the mean specific heat between 0 deg. and 805 deg. C.

$$S_m = 0.1456 + 0.000188 \times 805 = 0.2969.$$

Hence the quantity of heat required to raise 3.12 lb. of ferric oxide from 60 deg. to 1481 deg. F. is

$$3.12 \times 0.2969 \times 1421 = 0.92633 \times 1421 = 1316 \text{ B.t.u.}$$

Summary—The quantity of heat which must be expended below 805 deg. C. (1481 deg. F.) in order to make 100 *lb. of clinker* is the sum of (*a*), (*b*), (*c*), and (*d*):

$$= (a) + (b) + (c) + (d)$$
$$= 45168 + 11729 + 7039 + 1316$$
$$= 65{,}252 \text{ B.t.u.}$$

or 1 lb. of clinker requires to be expended below 805 deg. C. (1481 deg. F.)

652.5 B.t.u.

Calculation of the Minimum Quantity of Heat Which Must Be Liberated Above 805 Deg. C. (1481 Deg. F.) in Order to Make 100 Lb. of Clinker

We assume, as above, that 100 lb. of clinker are produced from a dry slurry containing:

119.05 lb. pure calcium carbonate, $CaCO_3$.
18.46 lb. kaolin, $Al_2Si_2O_7 2H_2O$.
15.40 lb. hydrated silica (93% SiO_2; 7% H_2O).
3.12 lb. ferric oxide.

156.03 lb.—Total.

The calcium carbonate begins to decompose in the furnace with evolution of CO_2 at 805 deg. C. (1481 deg. F.) at this temperature, and before the calcium carbonate begins to decompose, we may assume that all the kaolin and silica have lost their combined water and the kaolin has been resolved into a mass of alumina and silica, so that the mass will consist of

Calcium carbonate, $CaCO_3$	119.05 lb.	66.67 lb. CaO 52.38 lb. CO_2	
Dehydrated kaolin	15.89 lb.	7.29 lb. Al_2O_3 8.60 lb. SiO_2	22.92 lb.
Dehydrated silica, SiO_2		14.32 lb. SiO_2	
Ferric oxide, Fe_2O_3		3.12 lb.	
Total weight		152.38 lb.	

The 119.05 lb. of $CaCO_3$ when decomposed yield 52.38 lb. of CO_2 and 66.67 lb. of CaO.

So that as soon as the expulsion of the carbon dioxide is completed, the solid mass will consist of

Lime, CaO	66.67 lb.
Alumina, Al_2O_3	7.29 lb.
Silica, SiO_2	22.92 lb.
Ferric oxide, Fe_2O_3	3.12 lb.
	100.00 lb.

This mass will unite to form clinker with the evolution of some heat.

The necessary calculation may be carried out as follows:

(*a*) Calculate the amount of heat absorbed in decomposing 119.05 lb. of $CaCO_3$ at 805 deg. C. (1481 deg. F.).

It has been shown that the decomposition of 1 lb. of $CaCO_3$ at this temperature absorbs 682 B.t.u.

Hence, to decompose 119.05 lb. of $CaCO_3$ requires

$$119.05 \times 682 = 81{,}192 \text{ B.t.u.}$$

(*b*) Calculate the amount of heat evolved in the exothermic reaction when 66.67 lb. of CaO, 7.29 lb. of Al_2O_3, 22.92 lb. SiO_2, and 3.12 lb. of Fe_2O_3 unite to form 100 lb. of portland cement clinker at 805 deg. C. (1481 deg. F.).

The extremely accurate results of R. Nacken in 1922 (see Pamphlet No. 3 of the B.P.C.R.A., "The Exothermic Reaction of Portland Cement Clinker Formation," Table 14, p. 14) lead to the result that, to every 1 lb. of clinker produced from the slurry, 179.93 B.t.u. are evolved.

So that when 100 lb. of clinker are formed, there are *evolved* 17,993 B.t.u.

(*c*) Calculate the amount of heat *absorbed* in raising the resultant 100 lb. of clinker from 805 deg. C. (1481 deg. F.) to the highest clinkering temperature of, say, 1370 deg. C. (2498 deg. F.).

Very careful determinations of the specific heat of clinker at high temperatures have been made recently by S. H. Harrison in conjunction with Dr. W. D. White of the Carnegie Institution of Washington Geophysical Laboratory ("Report on the Specific Heat of Portland Cement Clinker," published by the Committee on Conservation Portland Cement Association, 1923).

The specific heat of any unchanged lime (CaO) in the mass is taken as nearly equal to that of the clinker. Harrison (*loc. cit.*) gives the following formula for calculating the amount of heat expressed in centigrade units required to raise 1 lb. of the clinker from 0 deg. to t deg. C.:

$$Q = 0.1754t + 139144 \times 10^{-9}t^2 - 125 \times 10^{-9}t^3 + 4685 \times 10^{-14}t^4.$$

Substituting in succession $t = 1370$ deg. C. and $t = 805$ deg. C. in this formula and subtracting, we obtain the amount of heat (in centrigrade units) required to raise 1 lb. of clinker from 805 deg. C. (1481 deg. F.) to 1370 deg. C. (2498 deg. F.) as follows:

$$Q = 0.1754(1370 - 805) + 139144 \times 10^{-9}(1370^2 - 805^2) - 125 \times 10^{-9}(1370^3 - 805^3) + 4685 \times 10^{-14}(1370^4 - 805^4)$$

= 159.25 centigrade heat units (1 lb. water through 1 deg. C.)

= 159.25 × 1.8 B.t.u.

= 286.65 B.t.u (1 lb. water through 1 deg. F.).

The mean specific heat of the clinker between 805 deg. and 1370 deg. C. (1481 deg. to 2606 deg. F.) is

$$\frac{286.65}{565} = 0.2819.$$

Hence the total amount of heat required to raise 100 lb. clinker from 805 deg. C. (1481 deg. F.) to 1370 deg. C. (2498 deg. F.) is

28,665 B.t.u

Summary—We are now in a position to calculate the minimum quantity of heat required to be absorbed *above* 805 deg. C. (1481 deg. F.) in order to produce 100 lb. of clinker.

This quantity of heat Q *is*

	B.t.u.
Heat *absorbed* in decomposing 119.05 lb. of $CaCO_3$ =	−81,192
+ Heat *evolved* in the exothermic reaction =	+ 17,993
+ Heat absorbed in raising 100 lb. of clinker from 805 deg. C. (1481 deg. F.) to 1370 deg. C. (2498 deg. F.) =	−28,665
Total	−91,864

Hence, in order to produce 100 lb. of clinker, we must expend *above* 805 deg. C. 91,864 B.t.u., or 1 *lb. of clinker requires* 918.6 *B.t.u. expended on it above* 805 deg. C. (1481 deg. F.), but only 652.5 B.t.u. *below* 805 deg. C. (1481 deg. F.).*

*It should be carefully noted that it is a fallacy to state that the total *minimum quantity* of heat required to make 1 lb. of clinker is 918.6 + 652.5 = 1571.1 B.t.u., because this statement takes no account of the quantity of heat recoverable from the hot clinker and evolved gases. Allowance is made for these quantities later.

All that the above statements mean is that in making 1 lb. clinker the raw material mixture must be subjected to a steadily increasing temperature, starting at 60 deg. F. and finishing at about 2,498 deg. F., and that the raw *mixture* must absorb 652.5 B.t.u. *below* 1,481 deg. F. and 918.6 B.t.u. *above* 1,481 deg. F. before 1 lb. clinker can be formed.

(To be continued)

Anhydrite Plasters and Cements

AT THE ANNUAL MEETING of the Mining Society of Nova Scotia, A. E. Flynn, professor of mining, Nova Scotia Technical College, Halifax, N. S., presented a paper on the results of researches on anhydrite. This is a brief abstract of the paper which was published in the *Canadian Mining and Metallurgical Bulletin* as part of the Transactions of the Canadian Institute of Mining and Metallurgy for 1930.

The work was done in the mining department of the college with R. E. Hanson, K. M. Ed, J. C. Hall and G. W. Baker acting as co-investigators for portions of the work.

The paper gives detailed reports of experiments performed with natural and artificial anhydrite and shows that a cheap cement can be manufactured from anhydrite. Plasters having a set as quick as ten minutes and a strength as high as 300 lb. per sq. in., have been made, and by simply using a suitable cheap catalyzer. When calcination was employed, the paper shows, the tensile strengths of 465 lb. per sq. in. could be obtained.

Finely ground anhydrite also was found to have setting properties without the use of a catalyzer but the strengths so obtained were low and not commercially interesting.

The paper shows the result of considerable research and indicates economic possibilities for anhydrite cements that will bear watching.

Explosives as a Civilizing Force

THE IMPORTANT PART played by explosives in peace-time progress as a modern civilizing force, was brought out in an interesting way in a recent radio broadcast by Dr. Julius Klein, assistant secretary of commerce.

Although perhaps more often thought of in connection with war and as an instrument of havoc than as a helpful constructive force, his talk helped to correct this impression in emphasizing the role played by explosives in our peace-time progress.

Considered as a concentrated form of energy or power ready to do instantly the work of thousands of men, it may well take first rank as a liberator from the hard toil and drudgery of past ages, and is indeed a sort of magic Aladdin's lamp by means of which all kinds of large scale works are accomplished. By it raw materials are released, great railway tunnels and cuts are made possible, and almost everything connected with our daily lives is indirectly the result of the use of explosives.

Black-powder, or gunpowder, as it was more commonly known, is the oldest explosive and was probably discovered by the Chinese in remote times, making its appearance in Europe in the fourteenth century.

The chemical combination which we know today as nitroglycerin was discovered in 1847 by an Italian chemist named Sobrero, and although he pointed out its possibilities as an explosive, it was in his day actually used only in medicine.

In 1867, Alfred Nobel, the Swedish inventor, discovered a practical process of making nitroglycerin on a large commercial scale, and five years later invented dynamite by absorbing the nitroglycerin in a porous material similar to fuller's earth. These developments revolutionized mining methods, and later improvements in the manufacture of explosives led to their present general use in industry.

In addition to the more common and well known uses explosives are also being made use of in a great many unusual and interesting ways. For example, along the Gulf Coast, they have been used to explore the earth's structure and to help locate favorable drilling areas in oil and sulphur deposits. For this purpose a small charge is fired in a shallow hole and the vibrational waves radiating from it are measured electrically at other points and the results charted, thus indicating the nature of the deposits in between.

Of the 500 million pounds of commercial explosives used annually in the United States, about one-sixth is used in the quarrying and production of non-metallic minerals, one-fifth in metal-mining, a little more than one-third in coal mining, and the balance in general construction work.

This broadcast has been published in booklet form by the Institute of Makers of Explosives, 103 Park Avenue, New York.

Two New Gravel Producing Plants in Milwaukee District

Kohler Bros., Prospect Hill, Wis., and Central Sand and Gravel Co., Milwaukee, Apparently Succeed in a Much Planted Territory by Being Equipped to Make Special Materials, or Materials Under Special Conditions

By Gordon F. Daggett
Milwaukee, Wis.

FOR SEVERAL SEASONS prior to the present one, Kohler Brothers have owned and operated a dry screening, pit-run gravel plant at Prospect Hill in Waukesha County, about 15 miles from Milwaukee, Wis. The pit had developed such a high grade of gravel on a 60-ft. face, that early in 1930 they decided to build a modern washing and screening plant. The first idea was to wash the gravel only, as the sand was exceptionally clean and well graded in the pit. Accordingly, the new plant was designed with provisions for addition of a sand-washing unit later.

Author's Note

BOTH of these plants were built for special market conditions, and are operating steadily.

Just as a comment on conditions here in the sand, gravel and crushed-stone market, it is a wonder to me to see the new plants start up and succeed from the beginning, where they are equipped for special material production. I fully believe the day of ordinary sand and gravel as we used to know it has passed.

Excavation in the pit is performed by a gasoline shovel, which discharges material into a portable field hopper, having a reciprocrating feeder suspended underneath, feeding material on to a portable, steel-framed, belt conveyor. This conveyor is designed as a beam, requiring no supports except as desired at the ends for convenient field operation. This conveyor is a 24-in. belt on 75-ft. centers, with a speed of 250 ft. per min.

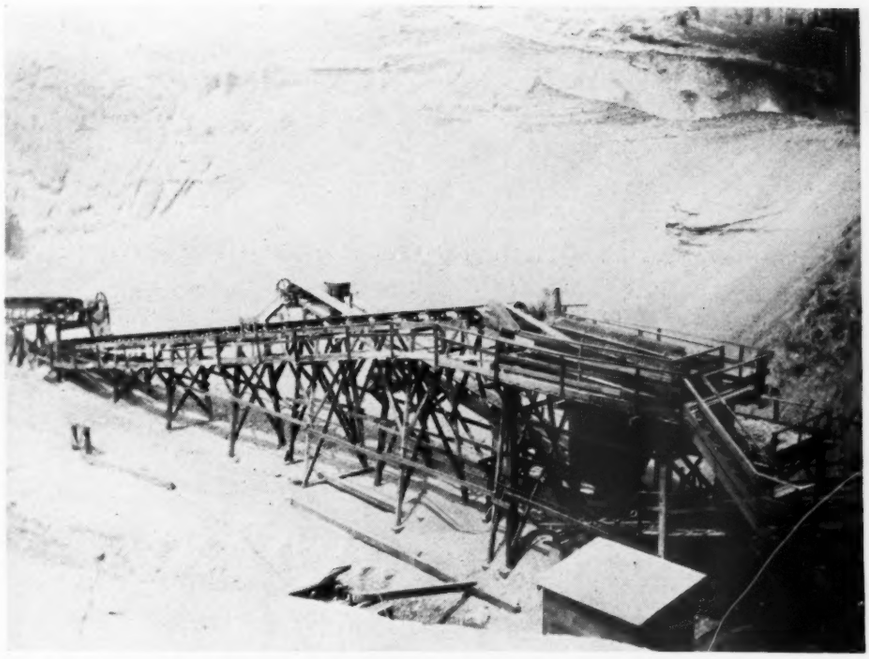
Material from this belt is discharged onto a stationary 24-in. belt conveyor, on 100-ft. centers, which in turn discharges into a 48-in. by 12-ft. rotary scalping screen. Minus 2-in. material is passed through for transportation to the main plant, while plus 2-in. and minus 8-in. material is passed into a gyratory crusher. The crushed material is then returned to the field belt by a 24-ft. by 54-ft. 0-in. belt conveyor for a repetition of the scalping cycle. Crushing in the pit is not heavy, as the maximum size runs around 6 to 8 in.

From the scalping screen, material of minus 2-in. in size is transported to the main plant on a 24-in. belt conveyor, on 160-ft. centers. At the head of this conveyor is a special "butterfly" bottom-gate hopper so designed as to bypass pit-run material directly into a bin for loading, or to pass the material into the washing screen for manufacture into coarse aggregate for concrete work. The main screen is a 48-in. diameter by 16-ft. length rotary screen, with 10-ft. manganese-steel sand jacket, 60 in. in diameter and having ¼-in. by ¾-in. slotted openings for dry screening. No water was introduced into this screen until after the sand had been dropped. With this long jacket in use, two sizes of gravel were screened, namely, pea gravel, and building stone. Sand in dry form was passed directly to the bin for loading. Water was first introduced into the gravel in the stone chutes leading from the screen, this amount being sufficient to thoroughly wash the stone, as it comes from the pit exceptionally clean.

View of the Kohler Bros. plant at Prospect Hill, Wis.

Sand Washing Later Introduced

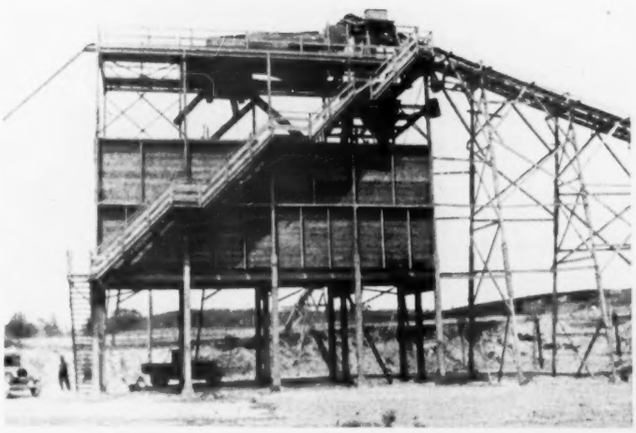
After operating for several weeks in this manner some objection was raised to the sand not being washed on account of the specifications on the job. Kohler Brothers then decided to put in the sand-washing unit and produce both washed sand and gravel, in addition to pit-run material. A Toepfer twin screw sand washer and classifier was placed under the screen without making any changes in the plant except the sand jacket. This was changed to a 6-ft. length of perforated metal having $\frac{5}{16}$-in. round openings. Water was then introduced in the screen in the customary manner of sprays at the rate of about 200 gal. per min., or in just



Field conveyors, scalping and crushing units at Kohler Bros. plant

sufficient quantity to supply the screw washer for efficient operation.

The original bins and crusher were used in the new plant, but otherwise all equipment was new. The actual bins are 12 ft. wide, 36 ft. long and 16 ft. high, set on top of high concrete walls, to permit of bottom discharge gates for truck loading. The capacity of the plant is approximately 400 cu. yd. per day of 10 hours. Transportation of material to market is entirely by truck. Stockpiling of excess production over market sales is at present done by trucks, and the material reclaimed and loaded by clamshell. But sales work is planned to keep down stockpiling to the minimum.



Steel-framed bins at Central plant with 500 cu. yd. capacity

Straight-Line Design Under Ideal Conditions

Water is obtained for the plant from a sump in the bottom of the pit. All power is alternating current electricity, and each operating unit has its own motor, so far as practical. As will be noted from the pictures, the plant layout is a straight line, under almost ideal conditions.

The company is operated as a partnership, the principal owners being Edward and Victor Kohler. The plant was designed and built by the Boehck Machinery Co., Inc., of Milwaukee, Wis., of which the author of this description was then chief engineer.

General view of the Kohler Bros. plant layout. The bank at the left is nearly 50 ft. high

Central Sand and Gravel Co. Plant Has Special Sand Feature

THE CENTRAL SAND AND GRAVEL CO. of Milwaukee, Wis., was able this last spring to negotiate a lease on a royalty basis for a deposit of gravel just west of the city. The company already had a general retail yard and was producing most of its sand at another plant, but desired to produce some if not all the stone required for their customers. The new deposit is heavy in stone, and this therefore was the primary reason for the lease and the new plant. A capacity of approximately 400 cu. yd. per day (both sand and gravel) was desired for delivery by trucks to the city markets. The pit face is low, being about 18 ft. maximum above the water, with rather heavy stripping. But the nearness to market was the determining factor and a contract was let to the Boehck Machinery Co., Inc., of Milwaukee, to design and build a plant, turning same over to the purchaser in running order.

The general features of the plant are usual, consisting of pit excavation by means of a gasoline shovel, discharging material into a portable hopper equipped with a reciprocating feeder. This feeder delivers material to a 24-in. by 90-ft. 0-in. centers belt conveyor, running at 250 ft. per min. on a steel framed truss, designed to require only

end supports. This permits of complete flexibility to meet all field operating conditions for the shovel. This conveyor is termed by the writer a "fanning" conveyor, because of its portability. The fanning conveyor discharges to a field conveyor (24-in. by 50-ft. 0-in. centers) carrying material to the scalper screen. Here is the unusual feature of the plant. The scalper screen is cylindrical, 42 in. in diameter, 8 ft. long, and equipped with a 54-in. by 6-ft. sand jacket, having ⅜-in. round perforations. Here, in dry condition, over 95% of the minus ⅜-in. material (sand) is dropped out from the coarse material cycle to be dealt with separately. The plus ⅜-in. to minus 2-in. material is passed through the scalper into a sand jacket and then delivered to the main belt conveyor (24-in. by 162-ft. 0-in. centers), which carries it to the main washing plant. Oversize stone is discharged from the scalper screen directly into a 10-in. Superior-McCully gyratory crusher, and after crushing is returned by an 18-in. by 40-ft. 0-in. centers belt conveyor to the field conveyor to repeat the scalping cycle.

At the main plant, material is delivered to a 48-in. by 16-ft. cylindrical scrubber screen, having a scrubber section 6 ft. long, a 10-ft. main stone screen, and a 6-ft. by 60-in. sand jacket to take out any remaining sand. Sand and water from the jacket flow into a No. 7 Smith Engineering Works sand settling tank and the sand is then passed to a bin for loading.

Three sizes of gravel or coarse aggregate are made: Pea, building, and paving sizes. Arrangements for stock-piling by gravity chutes directly from the screens have been added for both the building and paving sizes of stone.

Central Sand and Gravel Co. scalper-crusher unit to left, special sand handling equipment at center and right, and in the foreground, waste flume

The bins are of steel framework with timber lining construction, with a capacity of 500 cu. yd. total, and are equipped with bottom-discharge gates for truck loading. Special water sprays are built into all chutes from the screens so as to insure a perfect washing of the material, which is very heavy on red clay in the pit face.

Special Sand Treatment

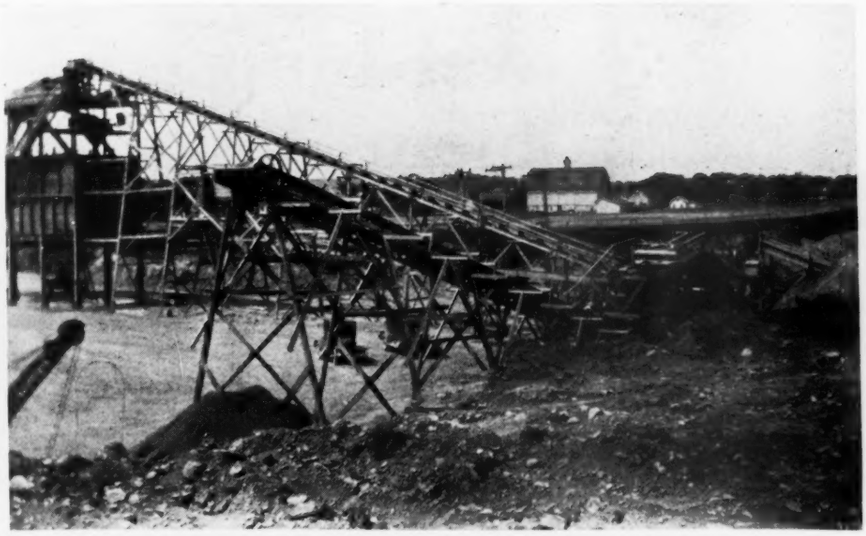
Sand taken from the stone scalping screen first mentioned, is carried by an 18-in. by 24-ft. 0-in. centers belt conveyor running at 350 ft. per min. into a special cylinder scrubber built of steel and equipped with several baffle rings, and four sets of lifting plates, to produce a thorough scouring and scrubbing action and insure removal of the red clay. This cylinder is 6 ft. long, and 42 in. in diameter, placed with a slope of 1½ in. per foot. There is a 10-in. ring on the discharge end which insures a good depth of water in the cylinder. All sand, water and all deleterious materials are discharged into a Toepfer twin screw dewaterer and classifier, then into a 24-in. by 75-ft. 0-in. center stockpile belt conveyor, and sent direct to stockpile. Reclaiming and loading into trucks from the stockpile is done by either a clamshell or shovel.

Water is furnished to the plant by a Fairbanks-Morse pump delivering approximately 500 gal. per min. All power in the plant is 3-phase, 60-cycle, 220-volt alternating current electricity, and each piece of equipment has its own power unit in so far as practical. Waste water is carried from the plant by a box flume, and discharged so it will eventually filter through into the main pump sump.

Special sand unit at Central plant showing cylinder scrubber in center surrounded by runway

Damaged by "Twister" During Construction

During construction one of the worst "twister" tornado wind storms ever known in the Milwaukee district occurred one night about midnight and the trestle work of the main conveyor, which was only partially finished, was lifted almost vertically a few feet and tipped over with very little damage resulting. Had the same storm occurred three days later the story would have been a different one.



View of Central Sand and Gravel Co. plant. Sand stockpile conveyor is in the foreground

This experience leads the writer to believe it a good policy to anchor down with temporary guy wires high conveyor structures until same are completed to a point of assured safety from wind storm damage.

The author as chief engineer designed and superintended construction of the plant.

Ideal British Gravel Plant

By Edmund Shaw
Contributing Editor, Rock Products

THE ENGLISH PAPER, *Cement, Lime and Gravel,* describes a new gravel plant at Staines, England, which it says has been designed along ideal lines, considering the material to be treated and the market for the products. It had the advantage of being erected on ground that had never before been worked for gravel. To suit trade conditions it produces separately crushed and uncrushed material and by bypassing the screens it produces a washed pit run material for which there is a demand, as there still is in some parts of the United States.

The material is excavated by a dragline and loaded into 2-yd. side- and bottom-dump cars. These are discharged into a 16-yd. hopper. A 30-in. apron feeder feeds the material to a 24-in. conveyor of 216 ft. centers, which raises it 62 ft. The conveyor discharges into a long washing cylinder on roller bearings. At the end of this cylinder is a double cantilever screen with 1¾-in. and ⅞-in. holes in the inner and outer jackets. This screen is like the American Gilbert screen, a conical screen that is fed and is discharged at the same end. The rejections above 1¾-in. go to a 30-in. crusher and the product between the 1¾-in. and ⅞-in. holes goes to a set of 30-in. rolls.

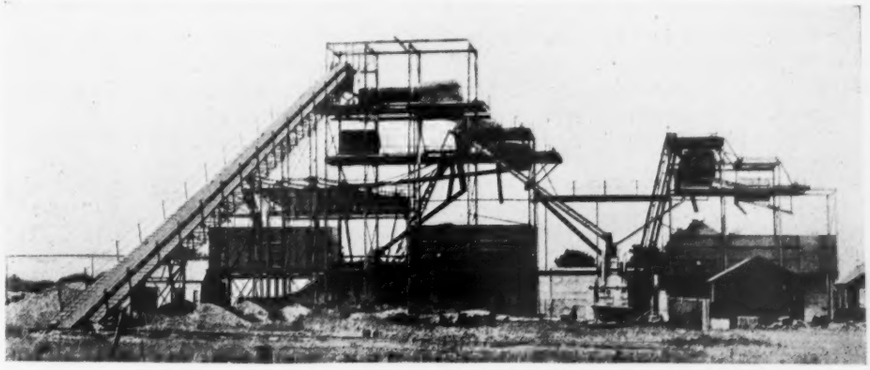
The stream of water with the minus ⅞-in. material is split between two cantilever screens with ½-in. holes. The oversize, which is called ¾-in. gravel, is sent to a bin. The undersize goes to two cantilever screens with 3/16-in. holes. The oversize, called ⅜-in. gravel, goes to a bin and the undersize goes to sand recovery tanks. These are of the well known drag type, fitted with flight conveyors.

The crusher and the rolls deliver their products to an 18-in. elevator which has overlapping steel buckets on a balata belt. It is of 41 ft. centers and it lifts the material to double cantilever screens with ⅞-in. holes in the main section and ½-in. holes in the outer jacket. Rejects of the ⅞-in. holes, if any, go back to the rolls. The material between the ⅞-in. and ½-in. holes (¾-in. crushed gravel) goes to a bin, and the ⅜-in. material and the sand are separated by a 3/16-in. screen as in the other part of the plant. But the sand is not dewatered by drags as before, for it is all washed and crushed material, free from clay. So it is sent to a drainage bin which has screen plates on the side for the discharge of water.

A 5-in. centrifugal pump supplies the water for washing and screening. It has a separate 40-hp. motor. An 80-hp. motor drives the feeder, conveyor, washer, screens and drags in the first part of the plant and another 80-hp. motor drives the crushing machinery. A 20-hp. motor drives the elevator and screens that follow the crushers. Motors are started from a switch house at the foot of the inclined conveyor, but stop buttons for emergency use are placed in several parts of the plant. The structure is steel and well provided with stairs, runways and platforms so that the machinery can be easily inspected and repaired. The only labor employed is for supervision and lubrication.

The output is 60 yd. per hour. The bins for uncrushed material hold 100 tons each, and for the crushed material 50 tons each. Concrete ground storage bins are set alongside the plant and filled by the overflow of the plant bins. A 5-ton crane runs on a track beside the ground storage bins. A second set of ground storage bins on the other side of the track can be filled if more storage is needed.

The illustration shows this to be a very well designed and constructed plant. The position of the crushers is not usual in American plants, but it is a good way to keep the crushed and uncrushed products separate. The design differs from what is almost the standard American plant in not utilizing the storage bins as supports for the screens and sand tanks. The great variation from American practice is in making such fine materials. Many an American operator would be glad to have the 1¾-in. material that is crushed to ¾-in. and as for the ⅜-in. stuff, it is a nuisance in some parts of the United States. It has been found necessary to install another set of rolls to make more of it in the plant described. And the 3/16-in. sand screen is finer than is used in any part of the United States with which the writer is familiar, although such sand is made as a special product in some places.



Some noteworthy features are incorporated into the design and construction of this English gravel plant

The Sand and Gravel Industry and Its Problems

Part II—Hydraulic Operations—General and Specific Considerations

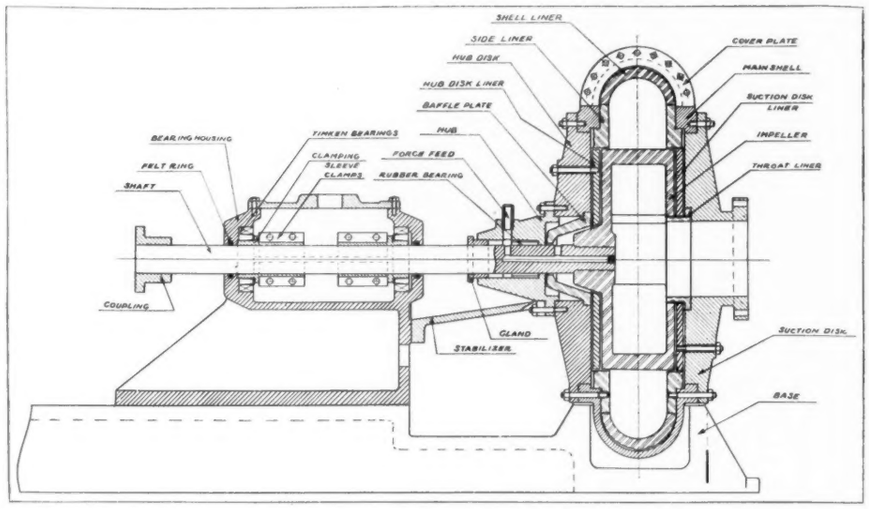
By John Zollinger
Oakhurst, N. J.

FOR THE MANUFACTURER, professionalist or business man in general, Sunday signifies a day of rest or recreation, but the operator of a gravel plant either works, or visits some other gravel plants. Upon entering on any Sunday excursion with my family, I have to give solemn assurance to keep at least one mile away from any sand and gravel plant, and in addition keep the conversation free of sand, loam, or anything remotely suggesting the all absorbing industry. None the less it has strikingly impressed me, that of all the plants visited, a dredging operation always presents the simplest, most compact and cleanest way of mining. A hydraulic plant, designed and operated properly, eliminates a good deal of labor and difficulties encountered with dry operations.

Water (and plenty of it) is the first requisite for this method of mining. The nature of the deposit also has its determining influence, but as a rule, does not preclude the use of a pump. Boulders and roots being the biggest obstacles, ways are generally found to get around these difficulties. Layers of clay or hard pan have to be overcome, and naturally the deposit should be investigated, before proceeding with the installation.

Pump Considerations

The next consideration will be the size of pump to be used, and that naturally depends on the production required. For the pumping of sand and gravel, nothing smaller than a 6-in. pump should be used, whereas for sand only even a 4-in. pump will give excellent results, depending on the desired yardage. The following data are usually found in pump catalogs, and will serve to convey the fundamental information as to capacities, etc. Yardage is naturally increased, if percentage of solids goes higher than 10%.



Type of pump designed by the author for long service

I have seen sand operations running as high as 30% solids; this of course depends on the distance and even construction of the pipe line.

The type of pump construction to be used seems to me very important, since there are machines on the market which will need very little attention after their installation, and the prices are so little higher, that only the best equipment obtainable should be purchased.

About two years ago the writer started to experiment with various pumps and arrived at the following results: Since the shell was the first thing to wear out, sectional liners were used and gave good results. Timken bearings were then installed, which left the alignment between pump and bearing intact, even though the impeller was removed. This left the shell and bearing a permanent installation, since only the top of the pump had to be removed, to insert the liners. The shaft was then drilled at the end and a series of radial holes provided to feed the water to the center of shaft and discharge it through similar holes, directly in back of impeller, thereby keeping grit and other abrasive material out. The baffle plate was inserted as an additional precaution. The experience proved, that whereas the bolts, holding the hub to the shell, were completely cut off in the old pumps, with this arrangement, after pumping 60,000 tons of material, the paint was still on the baffle plate. This type of pump has proven very satisfactory and economical. Actual experience over a period of two years has shown a saving of two-thirds on replacements, and the ease with which such replacements are made save money and valuable time, at a time when production is most desired. The drawings are self-explanatory and should give the reader a fair idea of the advantages embodied in this type of pump.

Whatever make of pump is decided on, the fundamentals will be the same. If the operation consists of a large proportion of gravel and stone, manganese steel should be used; if sand constitutes the chief aggregates, semi-steel or cast-iron will last as long or longer, since manganese steel does not resist direct abrasion, but needs the pounding or hammering action of gravel to give best results.

DATA ON THE CAPACITY OF PUMPS

Size of pump diam. suction and discharge in inches	Capacity in cu.yd. per hr. 10% solids; velocity discharge 12 ft. per sec.	Horsepower required for each 10 ft. total head	Will pass solids diameter in inches	Diameter and face of pulley in inches	Friction losses per 100 ft. discharge pipe, 10% solids	Capacity in gal. per min. when pumping clear water; velocity discharge 12 ft. per sec.
4	14	4	2	12x12	16½	471
6	30	7	4½	20x12	11	1058
8	60	11	6	24x14	8¼	1880
10	90	15	8	30x20	6½	2938
12	125	21	9	30x22	5½	4230

Runner vanes tipped with Stellite have proven to last longer, but as a rule a pump, if properly selected, will pay for all legitimate wear.

The priming pump may be of any standard make and should have ample capacity to prime the line quickly and maintain a good pressure. Forty to 60 lb. pressure should be sufficient, and such a pump can be used to jet the bank, should it be necessary.

Direct-connected units will give the least trouble, but where such installations are impossible I have found V-belt drives the most satisfactory. There is no slippage with this type of drive and moisture will not interfere with its operation. The writer has replaced gear drives with V-belts, driving as low as 80 r.p.m. transmitting 40 hp., running at 1800 r.p.m. This particular drive is out of doors with no protection and has not given any trouble during the entire season. The manufacturers of these drives have standardized the lengths of belts and will furnish complete data for any installation. A silent-chain drive may be preferred, where it is impossible to keep away from oil and grease. With either one of the drives it is possible to save floor space since the center distance between driving and driven unit is cut to a minimum.

The hoisting equipment, for raising and lowering suction pipe, moving the boat, etc., generally consists of a small hoist, with a single or double drum. Some smaller installations move the dredge with hand winches, and one particular outfit operating an 8-in. dredge uses a single-drum hoist with niggerhead. All ropes are led through eyes and fastened with cleats alongside this niggerhead and the boat can be moved quickly in every direction with this method. If a cutter or ladder is used in connection with the pump, more hoisting equipment is of course necessary, and the construction of the dredge will have to be built to accommodate this equipment.

No standard design of barge has been

John J. Zollinger

as yet adopted to carry each size of dredge pump. I have seen barges ranging from an assembly of barrels with a shack on top to symmetrically designed sectional buildings. The size seems at all times to be the main point to worry about. It is a peculiar thing, that everyone, who is about to build a barge, will invariably ask, "How big do you think I should build the boat?" Here is our idea of a comfortable size, for each of three sizes of pumps:

6-in. pump	Deck, 20x34 ft. Hull, 18x32 ft. Depth of hull, 2½ ft.	Building 14x28 ft.
8-in. pump	Deck, 22x34 ft. Hull, 20x34 ft. Depth of hull, 3 ft.	Building 18x30 ft.
10-in. pump	Deck, 22x38 ft. Hull, 22x38 ft. Depth of hull, 4 ft.	Building 18x34 ft.

Of course, I do not claim that these sizes are to take care of all installations, but I have found them satisfactory for general dredging purposes using straight suction. A young man in my vicinity has built an 8-in. dredge, which he claims can be taken apart in 8 hours and transported in sections on a ½-ton truck. I have seen the dredge and it certainly seems to be an ideal way to build one which has to be removed or disposed of in the field. The sketches should enable anyone to build such a piece of equipment, and since this particular one has been in operation for two years, it is not an experiment.

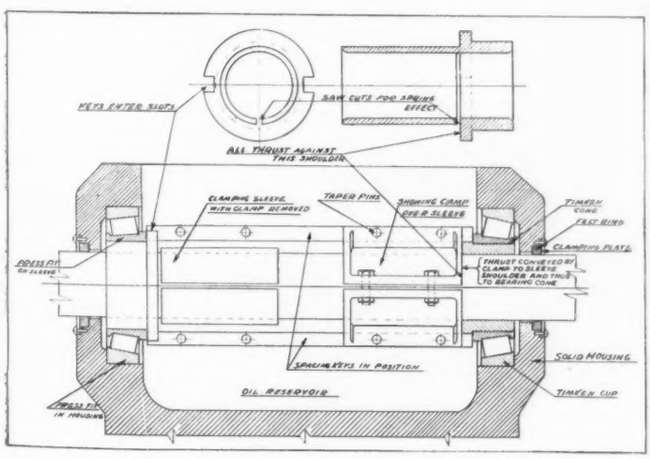
Details of a Portable Dredge

Each of the four pontoons are built separately, using if possible long leaf yellow pine. The 2x10-in. boards should be either bevelled at the mill or, where this cannot be done, a hand plane will do the work quickly. The opening for caulking should be about ¼ in. at the extreme, tapering to a close fit on the inside of box. All boards run lengthwise and 2x6-in. stanchions will give good nailing surface. Before covering the box, 2x4-in. X-braces are nailed in place, care being taken that braces are alternated, in order to provide nailing surface uniformly on all sides.

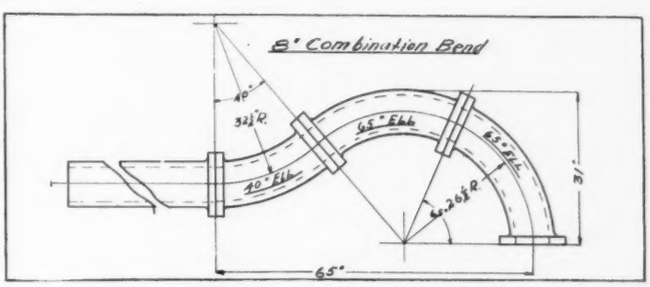
These boxes are caulked, creosoted and covered with pitch and should give no trouble, making a perfectly watertight job. The top need not be pitched if directly used as a floor, but should be tight. A hole is drilled in a convenient place and pipe flange or other suitable fitting provided, to pump out any water that might get inside the pontoon. Four men can handle such a box and load it without any trouble.

When assembling the hull 2x4-in. spacers are nailed up and down on the two outside seams and 3-in. spacers on the center seam. These spacers serve two purposes: first, to provide water space all around the boxes and, second, an opening for the tie rods, which hold the 6x8-in. whalers in place. The top and bottom whalers are tied at every section, while the outside whalers are held with three tie rods. To force the four pontoons in place lengthwise, wedges are driven under the tie rods on the four corners of both ends. The top whalers form the sills for the building and all nuts and washers are let in the wood. No other floor is used, but metal strips are nailed over the openings caused by the spacers.

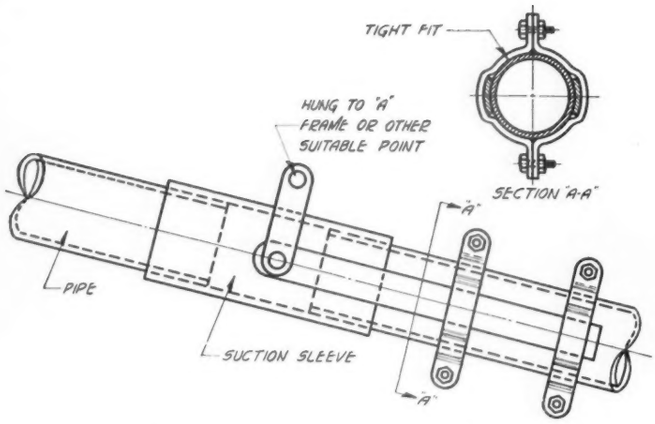
The building is in ten sections and should prove no big problem to any carpenter to build. The advantage of such construction is, that the whole can be built at a convenient place and transported to the field of operation. Also the resale value should be much greater, and the cost of building not much higher than



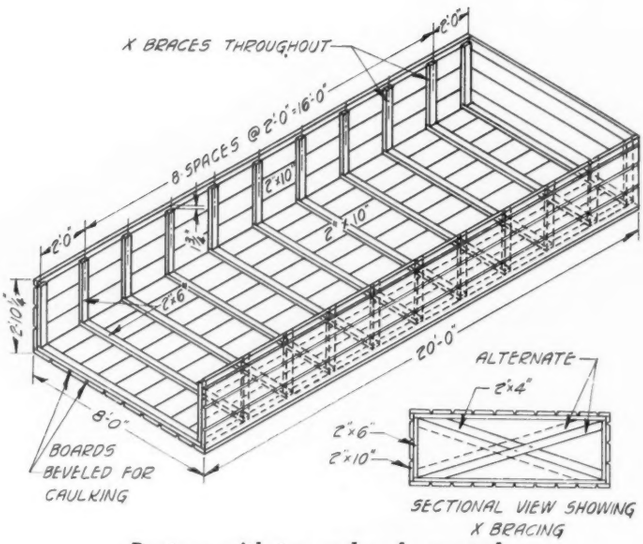
Unusual application of roller bearing



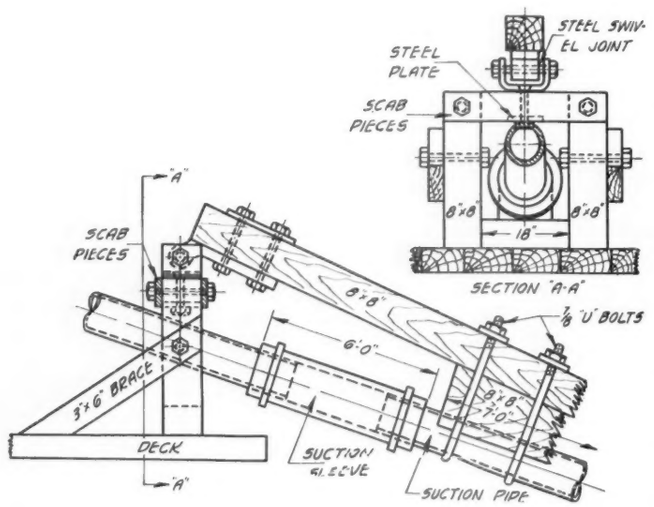
Combination bend recommended



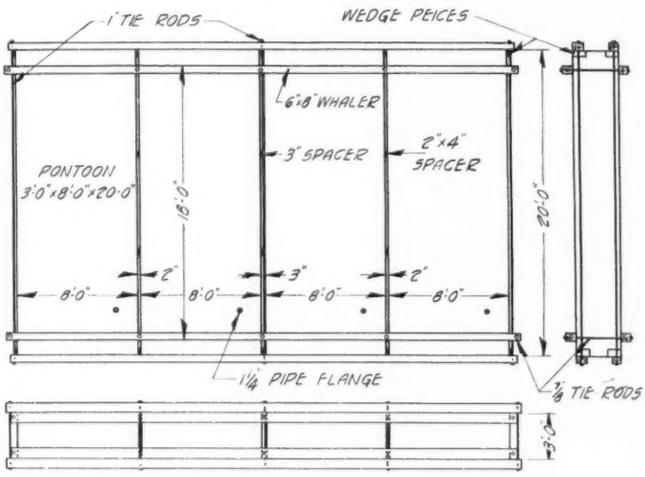
Arrangement to relieve hose joint—steel construction



Pontoon with top and end removed



Arrangement to relieve hose joint—wood construction



Sketch of hull of sectional dredge

any other type of construction which might be used.

As previously stated, the sizes of barges and their construction applies to straight suction units. To accommodate cutters, spuds, and additional hoisting equipment the barge will have to be built accordingly, first, to stand the added strain and, second, to properly balance the additional weight.

Arrangement of Machinery

The placing of the different items of machinery should be carefully considered. The boat must be properly balanced, with the discharge end slightly lower, to allow for the pull at the suction end while pumping. A handhole tee next to the suction disc of the pump will prove a great help, for the removal of any obstruction at the impeller. At the discharge I have found a combination bend such as shown far better than a 90-deg. ell or two 45-deg. ells. Sharp bends should be eliminated as much as possible, and for this reason it is well to have the suction pipe bent in a circle, rather than using standard ells. The angle of the suction bend should be from 75 to 80 deg. rather than a right angle.

The movements of the suction pipe are usually absorbed by a rubber sleeve approximately 6 ft. long. This sleeve is placed over the pipe at the edge of the deck, and forms a flexible joint, which takes all the shocks and impacts of the sucker. A very good way to prolong the usefulness of this sleeve has been evolved by a progressive operator and should prove a valuable help on any dredge. The stanchion, supporting the swivel joint, has to be built rigid to withstand the strain and the center of hinge pin should be as close to the pipe as possible. With this arrangement there is no buckling at the joint and much wear is taken away from the sleeve.

The discharge line is usually supported by pontoons, which may be constructed in various fashions. Two steel drums caught in a wooden frame will make an excellent float and since it is only a matter of addition, will support most lines up to 10-in. Rubber sleeves should form flexible joints every 50 ft. or at such places where flexibility is desired. As a rule a longer pipe line laid in a curve will be more suitable to start with, then as the dredge advances the line will straighten out until more pipe has to be added.

There are many tricks in the operation of a dredge, and common sense will go a good ways to solve some of the troubles each operation will develop. It's a great business for those who like hard knocks and plenty to think about.

(To be continued)

Des Moines, Ia., Dealers Forego Profit on Cement

IN AN ATTEMPT to increase construction in Des Moines, Ia., and thus ease the unemployment situation, a number of local building material dealers recently decided to sell portland cement at cost from the car, according to L. C. Perkins, president of Perkins Builders Supply & Fuel Co.

As a result cement here will go from 72c to 53c a sack.—*Des Moines* (Ia.) *Register.*

Important Papers in Abstract

Valuable Facts About Feldspar

MUCH VALUABLE INFORMATION on the feldspar industry is given in U. S. Bureau of Mines Information Circular 6381, October, 1930, by Oliver Bowles and C. V. Lee.

While not a detailed report, it gives such information as would be of general interest from both the technical and economic aspects.

Descriptions of the various kinds of feldspar, with their properties, occurrence, methods of mining and milling, uses, and markets, are given, followed by statistics on production and consumption, both domestic and foreign, prices, tariffs and a bibliography of books and articles on the industry. The steps taken during 1930 by the Bureau of Standards in co-operation with the Feldspar Grinders' Institute to arrive at standard specifications and classifications are also given.

To producers and prospective producers of feldspar the following information is particularly pertinent:

Grinding Capacity

The grinding capacity of the feldspar mills in the United States in 1929 has been estimated at approximately 480,000 long tons, while total sales in 1929 reached about 210,000 long tons. Present demands for feldspar, therefore, utilize only about 44% of grinding plant capacity.

Marketing

Feldspar is used chiefly in glass and ceramics, and hence the demand fluctuates with increasing activity or depression in these industries. In the United States during the last few years about 175,000 tons annually has been mined and ground for those trades alone.

The market for pulverized feldspar is confined largely to well-defined areas in New York, New Jersey, West Virginia, Ohio, and Indiana; the potteries of Trenton, N. J., and in the vicinity of Sebring, Ohio, are the principal centers of use.

Feldspar is generally sold in carload lots. Several large companies both mine and grind their spar, selling the ground product to the potters and other users. Hundreds of smaller producers sell their output of crude spar to the various mills. Some companies market their output through a single broker or selling agency. Amounts less than carload lots usually are handled by brokers and supply houses. The consumption of ground feldspar is practically uniform throughout the year, though irregular fluctuations in demand may occur.

Feldspar is shipped in bulk or in bags. For bulk shipments the car is usually lined with paper, though the pulverized spar may be dumped directly on the car floor. Many shipments are made in burlap bags. The Feldspar Grinders' Institute, Inc., has announced recently the use of waterproof paper bags, designed to hold 100 lb. The bags are to be billed to the customer at cost and are not returnable. The shipment of feldspar in bags means less loss of spar, less contamination in transportation, and easier handling.

Crude spar is sold on the long ton basis, usually f.o.b. cars shipping point in carload lots.

Ground feldspar is sold on the short ton basis f.o.b. cars at grinding mills.

Imports and Exports

Imports in recent years have constituted somewhat more than 10% of the total domestic supply of feldspar. Almost the entire Canadian production is shipped to this country in crude form and ground in American mills. Import figures have been recorded since 1922 as follows:

Year	Long tons	Value
1923	24,271	$184,924
1924	35,139	284,716
1925	24,994	203,524
1926	29,941	251,896
1927	27,424	206,856
1928	27,857	224,920
1929	29,927	241,852

Small amounts of ground feldspar have been imported, but the quantities are included in imports of unspecified substances, wholly or partly manufactured.

Exports of feldspar are not recorded separately, but are known to be small.

Tariff

Feldspar was specifically provided for in the tariff acts of 1883, 1890, and 1894. Crude feldspar has been on the free list since 1883. Prior to the latter part of 1922, the duty on ground feldspar was 20% ad valorem, but dating from September 22, 1922, the duty was raised to 30%. The tariff act of 1930 places a duty of $1 per long ton on crude feldspar.

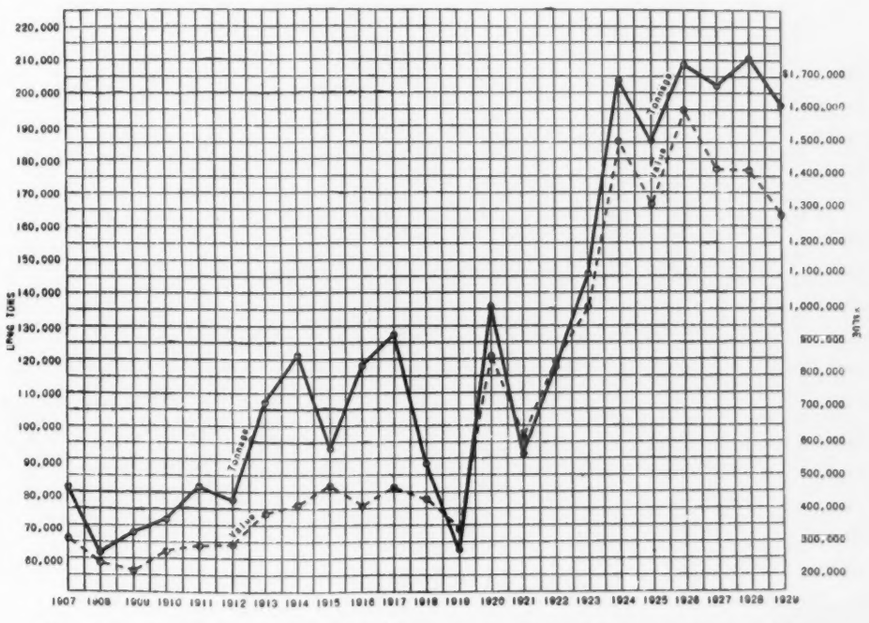
Prices

In 1929 the average value per long ton of domestic crude feldspar was $6.46, a decrease of 27 cents compared with 1928. The average value of imported crude was $8.08 per long ton in 1929, an increase of 1 cent as compared with the preceding year.

The average price in 1929 per short ton of ground feldspar from domestic crude was $13.73, a decrease of 82 cents compared with 1928, and of $3.11 compared with 1924, the year of highest recorded average. The average value of ground feldspar from imported crude was $20 in 1929, a decrease of 46 cents.

During the past 22 years the value of crude spar has varied considerably, but has shown a gradual increase to a figure nearly double that of the first recorded values. In 1907 the average price per ton for crude spar was $3.67, and in 1929 it was $6.46.

The average price of pulverized spar has also increased considerably, almost doubling during the last 22 years. In 1907 the price per short ton at the mill in carload lots was $7.53, and in 1929 it was $14.30.



Total production and value of feldspar in the United States, 1907 to 1929

Refractory for Lining Lime Kilns*

Experience Gained from Burning Lime for Sugar Refineries in Czecho-Slovakia

By Dr. Ing. Rudolf Barta
General Secretary of the Czechoslovac Ceramic Society of Proha (Prague)

THE lining of a lime kiln consists of tile cunciform sections placed circularly and cemented with refractory mortar. A ring comprises 12 to 38 similar tile. The capacity of the kiln is 30 to 50 cubic meters (39 to 67 cu. yd.). The height of the lining measures from 8 to 16 meters (27 to 54 ft.). The thickness is ordinarily 300 and sometimes even 250 millimeters (12 and sometimes 10 in.), in the smaller kilns; the interior diameter is from 6500 to 3500 millimeters (21½ to 11½ ft.).

For the different zones of burning to which the different diameters of the kiln correspond tile of variable sizes are used. It is important that each should have regular form. The joints should be sufficiently wide in order that the lining should not chink or split. There should be an open space of at least 100 millimeters (about 4 in.) between the lining and the steel jacket, an opening which is filled with cinders or other insulating material. On the other hand the number of joints ought to be reduced as much as possible. The larger the tile, the smaller will be the number of joints. The dimensions are, however, limited, for certain difficulties are encountered in using for these lining tile with too large dimensions. The dimensions should not exceed the following (Fig. 1): (*a*) From 165 to 284 millimeters (6½ in. to 11¼ in.); (*b*) 294 to 364 millimeters (11½ in. to 14¼ in.); (*c*) 250 to 370 millimeters (9¾ in. to 14½ in.); (*d*) 155 millimeters (6⅛ in.). The weight of a tile varies from 17 to 33 kilograms (37 to 74 lb.) and the weight of one cubic meter of refractory lining for lime kiln is 18 metric hundred weight (1980 lb.), while that of one cubic meter of refractory mortar is about 14 metric hundred weight (1540 lb.). For the refractory lining of a lime kiln, about 450 to 700 metric hundred weight of refractories are necessary, and 45 to 70 hundred weight of mortar, and in all about 5 to 8 loads (100 weight each) of material.

Each zone of burning requires a different quality of refractory. That results from the fact that in different parts of the kiln the chemical actions are not the same. In the upper part, that is to say, in the part where the shaft increases in size toward the bottom, and which is called the throat or mouth, there is produced a preheating of the limestone and the coke. In the part where the kiln has its largest diameter, and which is called the crucible, the burning itself takes place, and finally there is the lower part of the kiln, which becomes smaller toward the bottom, called the cooling chamber, which as its name indicates, permits the cooling of the burned lime. Naturally each period of burning changes gradually.

Properties Required in a Lining

The refractory lining of the upper part of the shaft is subject particularly to wear, for the raw limestone is ordinarily very hard and rubs against the lining. The refractory should consequently have the greatest possible resistance to abrasion. The upper part of the throat is subject also to shocks at the time of charging the kiln with stone and coke.

The refractory in the upper part of the kiln should be capable of resisting the penetration of hot gasses. The carbonic acid should not be able to escape through the masonry. As the temperature of the preheating zone reaches only 200 to 800 deg. C. it would not seem necessary to have a lining which has a resistance to very high temperatures, and it is satisfactory to use less refractory material. Its chemical composition has in general but little importance, but in view of the fact that the escaping gases which may contain SO_2 have an acid character, some precautions should be taken to see that the refractory material of the heating zone is not essentially basic, but rather neutral if not acid. As the cold air penetrates freely through the upper layers of the kiln during charging, it is better to use material which is sufficiently resistant to quick changes of temperature. The lining of the preheating zone should, therefore, have resistance from a mechanical point of view and should be dense, but it is sufficient that the refractory resistance is only 27 to 30 Seger cones.

Lining of the Burning Zone

The limestone and the coke, having had a preliminary heating, arrive in the zone of burning. At this time the temperature reaches 1200 deg., rarely 1300 deg., and more commonly 1000 deg. The material used in this zone should be of average refractory nature, perhaps 30 to 32 Seger cones. It is never subject to the action of exceptionally high temperatures. However, the heat has a certain influence, for it acts constantly at the same parts of the lining, all the time that the kiln is operating. The action of a heat less intense but more prolonged, often has the same influence as a stronger heat, but of lesser duration. The most important point in this zone is the property of resistance to the chemical action, produced by the oxide of calcium at high temperatures. Taking account of the chemical composition of this product, the use of acid refractories should be avoided. From the fact that the oxide of calcium is produced as a result of the decomposition of the limestone in liberating carbonic acid, it results that the burned lime is porous, voluminous and chemically reactive.

The coke cinders used as filling may act also on the lining and in different manners, according to their composition. The composition of cinders may be quite variable, and it is for this reason that their influence may also be variable. This circumstance mer-

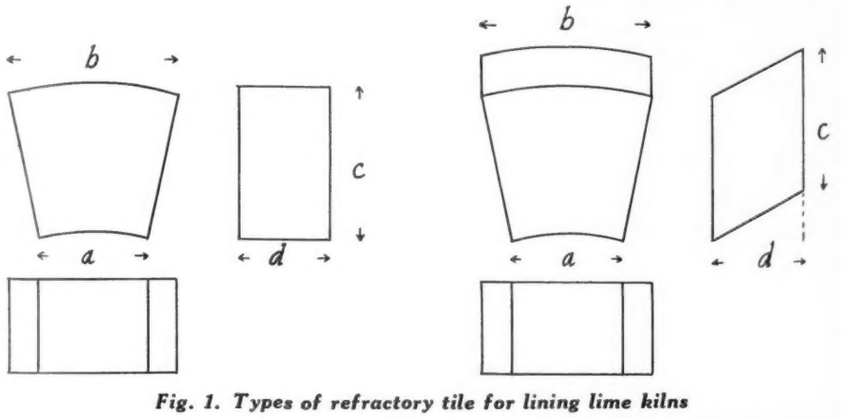


Fig. 1. Types of refractory tile for lining lime kilns

*Translated from the French *Revue des Materiaux de Construction* by C. S. Darling.
(Editorial Note.—The phrase *pierre de chamotte* of the original has been translated "tile" in some cases. *Chamotte* is burned and crushed clay and the English equivalent is "grog." "Refractory" or "refractory mixture" has been substituted for *chamotte* where these seemed better to convey the sense of the author.)

its serious attention and serves to some extent to determine the choice of the refractory materials to be used.

The lining of the burning zone should also have some resistance to wear and to rubbing.

Lining the Cooling and Cold Zone

The lining in the cooling zone and the cold zone must, of course, be able to resist the chemical influence of the lime; although these influences are less active than in the burning zone. This is due, for one reason, to the lower temperature, and on the other hand to other circumstances. On the other hand it is indispensable that in this zone the lining have a high resistance to wear, for the diameter of the kiln, in growing smaller toward the bottom, causes the walls to be subjected to a very considerable rubbing from the mass under pressure. It is true that burned lime is relatively soft, but it must not be forgotten that the rubbing takes place at a high temperature and under pressure. It is important besides that the refractory lining of the cooling zone of the lime kiln be stable with relation to variations of temperature in view of the possibility of air getting into this zone. The resistance of the refractory having to serve as lining in this zone should be of 29 to 31 Seger cones.

Materials Which May Be Used as Lining

1. *Natural Stone.*—Natural stones were used in an experimental way from 1910 to 1915 in the lining of lime kilns in German and Czechoslovac sugar refineries. Certain quartzites have the requisite properties of refractory resistance, resistance to wear and density. Their acid character presents, however, certain inconveniences. The stones must be hard and the nature of their structure is of greatest importance.

It can be stated that in general linings of quartzite are far from being as capable of resistance as the linings of manufactured refractories and that they are in reality only a substitute for them.

2. *Other Material.*—There have been used also on an experimental basis in the lining of lime kilns in France, America and particularly in England, bricks of chromite and magnesite, which show great stability with relation to the action of the lime, but which unfortunately wear rapidly.

Qualities and Kinds of Refractories

The qualities and the kinds of refractory products depend precisely on the quality of the raw materials and the methods of manufacture. A great influence is exercised by the choice of the clay and of the *chamotte* (the burned and granulated clay which is mixed with fine clay in making refractories). Clays are of different chemical composition and consequently show different physical and ceramo-technologic properties. Other important matters are the granulation, which for the clay as well as for the *chamotte*, gives sizes and forms of grain quite different; the proportion of the mixtures of clay and *chamotte* (50% to 80% of *chamotte* is permissible); the manner and the length of time of grinding as well as the length of time the moist raw material remains inactive; the processes of grinding which may be mechanical or by hand, slow or rapid; the processes of burning the brick, which depend above all on the type of kiln, the charging, the quality of the fuel, and the rapidity of burning and cooling of the burned material.

The refractory mortar which is used as cementing material is a mixture of fire clay and *chamotte*, the grinding of which is carried out according to particular specifications.

From what has just been said, it appears that the manufacture of a refractory of good quality is not altogether as simple as it may appear at first. It depends particularly on the competence and good faith of the manufacturers.

In order to obtain varieties of refractories of good quality, the factory which manufactures them must experiment with them in their own kilns and thus perfect them. The particular brands, for example, of the "United Factories for Building Materials of Prague," are of the following composition:

Products for the zone—	Brand	% SiO_2	% Al_2O_3	% Fe_2O_3	% CaO	% MgO	Refractory resistance (Seger cone)
Of heating	L	75.71	21.27	1.10	1.03	0.45	27 to 30
Of burning	RK	70.14	26.67	1.74	0.78	0.25	30 to 32
Of cooling	K	74.50	23.71	1.32	0.96	0.37	29 to 31

According to the reports published by the *Sundicat de fabricants de sucre de France (Circe. hebd.)*, France possesses natural refractory stones which are used in the lining of lime kilns, the composition of which is as follows:

SiO_2	from 75.80 to 96.10%
Al_2O_3	from 2.28 to 21.00%
Fe_2O_3	from 0.40 to 4.00%
CaO	from 0.05 to 5.30%

Damages to Refractory Linings

The choice of this or that product to be used for lining lime kilns is determined by the nature of the damage to which the lining is subjected. It is always necessary, even when using certain qualities of *chamotte*, to replace the lining in certain places. The use of a poor quality evidently results in much more frequent replacements.

The damages which cause the greatest annoyance are the chemical damages. That which is to be feared most is what is called "corrosion of the kiln." The corrosive agents in the zone of burning are the lime and the coke cinders. The refractory is attacked at high temperatures by these products, producing amorphous masses of greenish tint which contain clay and lime and which are called "slags." In practice, each lining, even of the highest quality, is more or less subject to corrosion. This damage occurs, however, only in a progressive manner when the conditions are favorable.

1. The causes of spontaneous chemical damages should at first be sought in the properties of the lining material used. The fire brick may eventually not be refractory, or perhaps its composition cannot offer sufficient resistance to the processes of corrosion. However, it must not be concluded that the material of the lining is the exclusive cause of corrosion in a kiln.

2. When the lining of the throat is improperly done, and particularly when the joints are too wide, there may be produced, although rarely, damages to the lining.

3. The lining occasionally disintegrates on account of the chemical combination of the lime. The cause of this, in certain cases, is the greater content of lime than of carbonate of calcium or magnesium. The oxides of iron act in a particularly unfavorable manner; they are reduced in burning and violently attack the linings of the best quality. Silica and the clay of the limestones are the causes of the formation of slag which corrodes the lining.

4. The linings are the more often injured by the action of cinders. It is for this reason that it is particularly necessary to watch the quality of the coke used in burning the lime. Good qualities of coke should produce no more than 9% of ash; there exists, however, some qualities, and these were forced upon the industry during the war, which produce even up to 30%. However, it is not only the quantity of ash which serves as an index, but also the composition. Coke cinders contain particularly silica, oxide of iron and clay as well as oxides of calcium and sulphur. The slagging of coke, its combustibility, etc., are not less important.

5. The corrosion of the lime can also be produced as a consequence of irregular combustion. The burning of the lime at high temperatures favors the formation of slag, especially when the limestone contains large quantities of silica and clay. The better lining fuses gradually even at high temperatures, which causes a much more intense corrosion.

Mechanical Damages

Independently of chemical corrosion, damages are also produced by mechanical causes. The most frequent are those caused by the grinding of the lining in the zone of heating of the throat, where the grinding is the most active. The cause of this grinding may be charged either to the refractory when it is too soft, or to the limestone. The error is frequently committed of charging in the kiln pieces of stone which are too large, which causes a much more rapid grinding than the use of smaller stones. The shape of the stones also has some importance; this depends on the structure of the stones, and the manner in which they have been quarried. A sudden charging of very large stones may crack or even shatter the lining.

Another damage of mechanical nature may be produced as a consequence of sudden cooling. There is then produced in the lining cracks and fissures, the enlargement of which or the increasing number of which as a consequence of the successive contraction and expansion of the lining depends upon the operation of the kiln. When the joints are too small, expansion causes bursting.

Dredge and pipe line recently installed to supply old washing plant

New Suction Dredge in the Indianapolis Territory

Brown-Huffstetter Material Co. Installs Dredging Equipment with Some Unusual Features

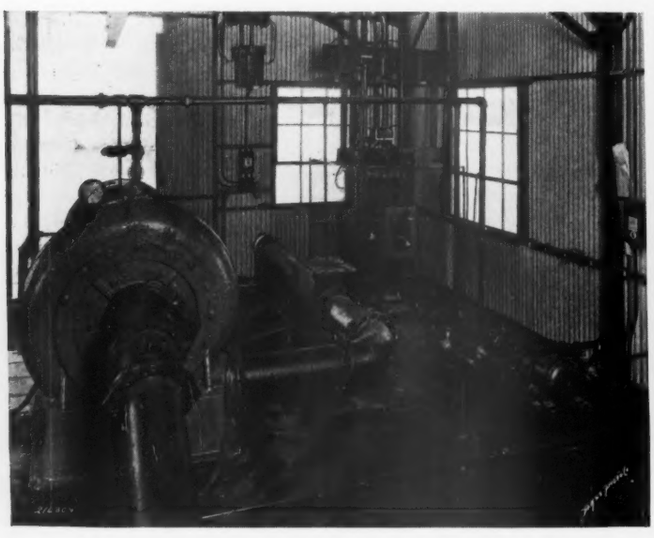
INDIANAPOLIS, IND., probably has more sand and gravel operations and more different operating companies per capita than any other city in the United States, and naturally competition is keen and prices low.

Sand and gravel deposits can be located almost any place in the vicinity, many dragline operations being within the city limits so that transportation costs are reduced to a minimum by the plants being favorably situated.

The business of this district in 1930 from a sale of material standpoint, i.e., tonnage moved during the year, has been far below normal, so that what business there was in sight early in the year had many hungry bidders. Those companies that got the business, it is to be noted, had outstanding characteristics: (1) Reliability and business integrity of the company itself; (2) good material, and (3) plant capacity sufficient to take care of the construction surges.

The Brown-Huffstetter Material Co. had long enjoyed the distinction that qualifies it to be embraced by characteristics Nos. 1 and 2, but it was only early last summer that its productive capacity was such as to lift it out of the small, high-cost type of operation into the ranks of the larger, low-cost producers. This increase in capacity was brought about by the installation of a new all-steel suction dredge, built and designed by the staff and the engineers of Hetherington & Berner, Inc., Indianapolis.

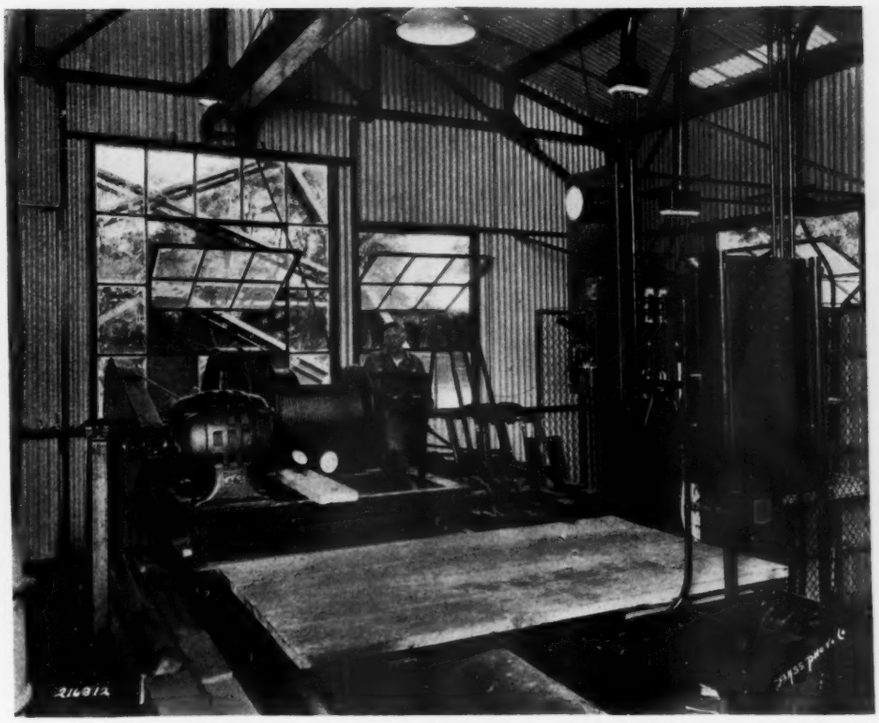
It was due to the fact that the Brown-Huffstetter company was in position to make prompt deliveries, during peak construction periods, that enabled it to secure contracts



Arrangement of suction and discharge lines to and from pump

The 10-in. dredge pump and its drive motor

this season which otherwise they probably would not have been able to touch. The company expects later to rebuild its screening plant as well.



Hoist and controls mounted over suction line, permitting unobstructed view of digging

Dredge Details

The new dredge hull and superstructure is of steel throughout, with the hull fabricated in two sections, joined together by turn bolts and an electrically welded seam and cover strip. Each section is composed of six water-tight compartments that give added rigidity and safety. The hull is 48 ft. long, 26 ft. wide and 4 ft. in depth, and draws 18 in. of water during normal operation. The dredging and control equipment has been so located that the dredge rides on an even keel when digging to any depth.

While not so large as some in the sand and gravel industry, this dredge, having a 10-in. Hetherington & Berner, Type R, heavy-duty pump, is one of the most complete in any commercial pit and has incorporated into its design some mechanical features as well as most minute details which have made the entire operation very successful, both from a capacity and economic standpoint.

The pump is equipped with a solid manganese-steel impeller and disc liners, and is provided with S.K.F. spherical, self-aligning ball bearings. The stuffing box, or hub bearing, is equipped with a water-seal type, rubber, cutless bearing mounted in a bronze sleeve over the shaft, thus eliminating the use of soft packing and the resultant plant trouble. The bearing in this particular pump has been in service since April 15, and had required no attention of any sort up to the end of the operating season. Adjustment for piston clearance is provided by an adjusting screw located on the motor end of the bearing pedestal, which is clearly shown in one of the photographs. Minimum clearance can be had at all times by a slight turn of the adjusting screw, thus keeping pump efficiency high.

The suction line is raised and lowered by a sliding sheave

The pump is direct-connected to a 250-hp., 720-r.p.m., slip-ring, Allis-Chalmers motor with Cutler-Hammer controls. The resistor is of a continuous duty type and designed for 50% speed reduction.

A 5-ton trolley beam is mounted over the deck and extends its entire length and beyond the deck at the stern.

Materials Handled—Capacity

The dredge, without a cutter, and operating in the kind of material that it does, has a capacity of 1000 tons per 10 hr., delivering the material through 750 ft. of 10-in. pipe to the plant, and at the same time elevating the product 55 ft. The pipes making up the line are provided with Dayton sleeve couplings and as an added precaution a ⅝-in. steel cable parallels the pipe line and is clamped to each sleeve so that probabilities of parting the pipe line are reduced to a minimum. On the suction side, the pipe line passes directly under the operating platform, eliminating the necessity of pipe el-

Illustrations indicate a very even balance of the hull

Brown-Huffstetter washing plant now supplied by new steel dredge

The 10-in. pipe line, 750 ft. long, has cable to prevent parting of line

bows, etc., and wear incidental to those parts. Thus the operator's platform is well above and commands an unobstructed view of the entire operation.

The material being handled is high in sand and fine material, so that approximately 25% of the total material dug is returned to the dredge pond as fines. The gravel is for the most part of small size (minus 3-in. and smaller), although some large boulders are occasionally encountered. These are prevented from entering the suction line by a suction cage having 7-in. open spacings.

At present the dredge is digging to a depth of 35 ft., with a 10-ft. bank above water line. It can dig, however, to a depth of 45 ft. No stripping is done, nor does the dredge use a cutter, but provisions have been made for installing an agitator device should it become necessary.

Gravel in the bed extends to below the present 33 ft. horizon and eventually a longer suction ladder may be installed so as to reach a depth of 60 ft.

The special dredge hoist is equipped with three drums. The two front drums carry the front shore lines, and the rear drum carries the suction cable. This hoist was supplied by Street Bros., Chattanooga, Tenn. This cable passes over the traveling sheave hung from the trolley beam and thence over a sheave mounted in the A-frame, to the bail. The traveling sheave is easily seen in one of the photographs. This arrangement insures the proper winding of the cable on the drum when the suction line is being raised. Two hand winches are placed on the rear of the boat for handling the stern shore lines.

The hoist is driven by a 15-hp., Fairbanks-Morse, squirrel-cage type, 900-r.p.m. motor equipped with an automatic starter. The power is transmitted to the hoist by a silent-chain drive.

The material being dredged is pumped to the old plant located on the north side of White River and South Harding street. The screening plant uses stationary screens for the gravel and a description of the operation was published in the July 20, 1929, issue of Rock Products. H. C. Huffstetter is president and Albert M. Brown, secretary and treasurer.

Soundness of Lime

LIME USED for the finish coat of plaster sometimes causes a type of failure known as "popping." Small particles of the finish coat expand, disrupting the surface which causes some of the plaster to fall off, leaving a pit or "pop." This is probably caused by the slow hydration of the constituents of the lime. The present method of testing for this type of failure as adopted by the American Society for Testing Materials involves steaming the lime at atmospheric pressure. Since this method did not appear severe enough, it was proposed to subject the lime to steam under pressure. The lime, mixed with enough calcined gypsum to prevent shrinkage, was spread as a thin coat on a porous porcelain base. After standing for an hour, or until the calcined gypsum was set, it was steamed for two hours at a steam pressure of 120 lb./in.^{2} in an autoclave. During the steaming the particles hydrate and expand causing "popping" or unsoundness. This method is essentially that described in *Technical News Bulletin* No. 144 (April, 1929) with the exception that steaming at 120 lb. pressure has been found preferable to the 20 to 25 lb. pressure as reported previously.

In order to compare the two methods, plastered panels were made using lime for the finish coat. Samples of the limes were tested by both methods.

Thirty-three panels were made up and allowed to age. Of the 33 panels, 24 have developed "pops." Twenty-three of them tested unsound on steaming at 120 lb. pressure, whereas only 12 tested unsound by the A. S. T. M. method. The argument, therefore, appears to be much better for the autoclave method than for the A. S. T. M. method.—*Technical News Bulletin* of the U. S. Bureau of Standards.

Geology of New Zealand

THE GEOLOGICAL SURVEY Branch of the Annual Report of the Department of Scientific and Industrial Research, 1929-30, published at Wellington, New Zealand, J. Henderson, director, gives information on the geology of New Zealand.

This 23-page extract includes sketch maps of the Wairoa, Murchison and Taumarunui Districts, and reports on the soils and geology of these and other districts of both the North and South Island.

According to the report, potential oil and gas fields exist, also coal seams, some of which have been worked, and some limestones, which have not been thoroughly investigated.

Atlas of Pennsylvania

THE PENNSYLVANIA GEOLOGICAL SURVEY has published a topographic and geologic atlas, No. 168, of the Lancaster quadrangle.

The Lancaster quadrangle is in southeastern Pennsylvania and covers parts of Lancaster and Lebanon counties. It comprises an area of 234 square miles between parallels 40 deg. and 40 deg. 15 min., and meridians 76 deg. 15 min. and 76 deg. 30 min. The greater part of the area lies in Lancaster county, only the extreme northwestern corner being in Lebanon county.

The Lancaster quadrangle was surveyed by R. W. Stone, of the United States Geological Survey, and Anna I. Jonas, of the Pennsylvania Geological Survey.

Keeping the Wheels Turning

Where "There Ain't No Business" A Live-Wire Producer Makes Some

By Wilfrid Redmond

IN THE LARGER CITIES when business isn't coming in the live operator goes out and brings it in, but in the smaller towns a slack period means, as a rule, that there is no further business to be had.

The only recourse of the small city operator is to sit down and figure out new uses for the rock products he has on hand, or look about for new products that have a slack season demand. The result is that new sources of business which contribute to the later growth of the industry, often have their origin in the smaller places.

R. F. Potts, sand and gravel producer of Casper, Wyo., is one of those small city members of the industry whom necessity has inspired to invent, in one case, a new and genuinely productive market for his materials, and in another instance, to introduce a new use for material that formerly had never been recognized as having any marketable value.

No one is in Casper very long before the peculiar landscaping around the filling stations is brought to his attention. Those little stretches of lawn which in most cities surround the driveways of these places are missing. Where grass is ordinarily grown cobblestones have been laid tightly together and the entire plot painted green so that from a distance it has the effect of the familiar lawn.

Having on hand a quantity of coarse rock which was accumulating at a rapid rate Mr. Potts conceived the idea of inducing a filling station owner to pave his grass plot with it.

The result was so effective that other stations adopted the idea until today there is scarcely one in Casper that hasn't its green cobblestone court. In the meantime the Potts Sand and Gravel Co. has disposed of its excess accumulation of coarse rock, at 75 cents a cubic yard.

Introduces "Mountain Soil"

Another expendient for keeping the wheels turning during slack season intervals resulted from a public-spirited campaign to beautify the city, a movement that had been neglected during the hysteria of oil boom days. The city fathers and the nurserymen united in a drive to encourage home-owners to surround their homes with gardens.

But when the garden-minded started to comply they discovered that the Casper soil had an affinity for morning glories and geraniums but not much else.

Now there is no soil anywhere better adapted to flower growing than that of the Rocky Mountains. Casper flower-growers went Mohammed one better. They not only went to the mountain but they brought some of it back.

Seeing a new source of business in this transportation of mountain dirt to Casper house-yards Mr. Potts went in for it. He ran newspaper ads extolling the fertility of mountain soil for flower growing and announced he was prepared to haul it at $1.50 a hundred from the vicinity of Garden Creek, six miles from Casper, to the city. During the spring, summer, and fall the company keeps one truck on the job for this work. The advertising emphasizes prompt delivery and full measure.

Universal Atlas Cement Plant at Northampton, Penn., Resumes Full Time

AN IMPORTANT and welcome announcement was made recently by Marcus M. M. Browne, secretary of the Northampton Chamber of Commerce, to the effect that he was informed by Morris W. Winsch, plant manager of the Universal Atlas Portland Cement Co., that plant No. 4, of that concern, would resume operations in full beginning December 1.

This plant had been running on part production since October 15, during which extensive repairs and improvements were made at the plant. During this period the employes were on half time.

Resumption of the plant on full capacity means that the employes will go back on full time and possibly a few additional men will be taken on. The notice coming just as the Christmas season starts will bring joy into many homes in Northampton and vicinity.—*Northampton* (Penn.) *Chronicle and News.*

Gravel Producer Wins Suit for Failure of Excavator to Fulfill Guarantee

DAMAGES of $9200 were awarded to the National Sand and Gravel Co., of Morrisville, N. J., by a Mercer circuit court jury recently. The claim was against an excavator manufacturer and followed the purchase of an excavator which it was alleged operated unsatisfactorily. A verdict of no cause for action was returned in the excavator manufacturer's counter-suit for alleged damage to the machine, which was replevined by the concern.—*Trenton* (N. J.) *Times.*

Utah Rock Asphalt Producer Prospering

AN expansion of the market for rock asphalt produced at quarries a short distance above Sunnyside, Utah, this year was reported recently by Arthur I. Smith, district representative of the Utah Rock Asphalt Co. Season's operations at the quarries and mill closed recently and will be resumed in the spring.

States to which the product has been shipped, outside of Utah, are California, Colorado, Illinois, Iowa, Kansas, Idaho, New Mexico, Nebraska, Oklahoma and Wyoming. Asphalt as a road building material was used extensively in Carbon county this summer, a total of 5.7 miles being laid. The work was done on the Spring Canyon-Helper road and stretches on the Kenilworth, Columbia and Price-Emery highways.

Operation of the quarries for the several months proved a distinct economic benefit to Carbon county, as the plant employed local labor entirely, and had a total pay roll during the summer of $60,000.—*Salt Lake City* (Utah) *Tribune.*

Gypsum Industry of Canada

THE CANADIAN DEPARTMENT OF MINES, Mines Branch, has published a report, No. 714, on the gypsum industry in Canada. The report, written by L. Heber Cole, of the Mines Department, is very complete, admirably illustrated, and shows what a government bureau can do towards serving an industry by not only giving a survey of the national gypsum resources but also by publishing the results of elaborate calcining tests on crude gypsum taken from the various deposits in the Dominion.

Inasmuch as Nova Scotia produces the bulk of the Canadian tonnage, which incidentally is one-third of the world's entire production, considerable space is devoted to a description of the various deposits and plants in that province. The other Canadian provinces are also well covered.

A valuable chapter to all gypsum manufacturers is the one devoted to the testing of gypsum. The author designed and built an electrically heated calcining kettle which he used for carrying out one phase of the testing done.

The book of 164 pages is priced at 30c. and can be secured from the Mines Branch of the Department of Mines, Ottawa, Can.

OFFICERS of the Clearwater Lime Products Co., on Orofino creek, southeast of Moscow, Ida., have announced plans to spend $100,000 within the next year to increase the plant's capacity and improve its efficiency. C. M. Loveland, retained as engineer, has been appointed superintendent of the plant in addition to his engineering work. —*Portland* (Ore.) *Journal.*

Thermal Efficiency of the Kettle Process for Calcining Gypsum

By Wallace C. Riddell
Consulting Chemical Engineer, San Francisco, Calif.

THE SO-CALLED "kettle process" is generally considered to be a crude, and, by some, an antiquated method for calcining gypsum. Approximately 90% of the calcined gypsum used in the United States is calcined in kettles. Accurate technical data relative to the thermal efficiency of the kettle process is not generally available. Careful operating data, taken over a period of years for several gypsum plants, indicate that the kettle process is more efficient than is generally supposed and compares favorably with other types of furnaces in general use. This is particularly so of the later heavy-duty type of kettles designed by the J. B. Ehrsam & Sons Mfg. Co., Enterprise, Kan.

To secure maximum thermal efficiency, care should be taken in the design of the kettle setting, especially the fire box, and in the method of operation. Operating a kettle for too long a period under dusty conditions lowers its efficiency. It has also been observed that there is an optimum rate of firing.

A summary of the operations of 26 gypsum plants shows that the majority calcine to a temperature of 340 deg. C. Careful checking and observation of a number of recording thermometers operating on plaster kettles indicate that gypsum "boils" at 248 deg. F. and 260 deg. F. is the mean average temperature at which the water of crystallization of gypsum is evaporated. If the recording thermometer bulb is installed close to the bottom of the kettle, the "boiling" temperature registered is approximately 260 deg. F.

The average temperature of the gypsum fed to the kettles at several plants where careful studies were made was 80 deg. F.

Gypsum, $CaSO_4 \cdot 2H_2O$, when pure contains 20.9% chemically combined water. Calcined gypsum (first-settle stucco), $CaSO_4 \cdot \frac{1}{2}H_2O$, when pure contains 6.2% chemically combined water. At the plants studied the combined water in the gypsum varied from 18.0% to 20.4% and the calcined gypsum from 4.3% to 5.8% combined water.

TABLE OF DATA SHOWING THE FUEL CONSUMPTION AND THE CALCULATED FURNACE EFFICIENCY FOR SEVERAL GYPSUM PLANTS

Plant No.	Kettle size feet dia. × height	Tons gypsum calcined	Fuel used — Total	Fuel used — Per ton	Av. time calcining per charge	Calculated furnace efficiency, %
A	10 ft. x 8 ft. Ehrsam	27,200	169,940 gal. oil	6.25 gal.	2 hr. 35 min.	53.2
B	10 ft. x 10 ft. Ehrsam	61,900	47,010,000 cu. ft. nat. gas	760 cu. ft.	2 hr. 30 min.	54.1
C	10 ft. x 10 ft. Butterworth-Lowe	7,100	42,950 gal. oil	6.04 gal.	3 hr. 0 min.	55.1
D	10 ft. x 8 ft. Ehrsam	2,560	16,190 gal. oil	6.33 gal.	2 hr. 20 min.	52.6
E	10 ft. x 8 ft. Butterworth-Lowe	1,780	12,190 gal. oil	6.84 gal.	1 hr. 30 min.	48.7
F	10 ft. x 10 ft. Ehrsam	10,100	73,730 gal. oil	7.30 gal.	2 hr. 45 min.	45.6
G	10 ft. x 10 ft. Ehrsam	24,200	19,593,000 cu. ft. nat. gas	810 cu. ft.	2 hr. 35 min.	51.0

Notes: Fuel oil = 18,500 B.t.u. = 149,700 B.t.u. per gal.
Natural gas = 1210 B.t.u. per cu. ft. (Approximate analysis = 67% CH_4 + 32% C_2H_6).
Example calculating:

$$\text{Furnace efficiency for Plant A} = \frac{498{,}400}{6.25 \times 149{,}700} \times 100 = 53.2\%.$$

At plant C, which shows the highest furnace efficiency, unusual care is taken of the operation of the kettles.

Heat Required to Calcine Gypsum

Using these data as a basis, the theoretical heat required to calcine gypsum ($CaSO_4 \cdot 2H_2O$) is calculated as follows:

1. The average specific heat of gypsum for the range 80 deg. F. to 340 deg. F. is 0.26.

(340—80) × 0.26 = 67.6 B. t. u. per lb.

2. The heat absorbed in decomposing gypsum ($CaSO_4 \cdot 2H_2O$) to calcined gypsum ($CaSO_4 \cdot \frac{1}{2}H_2O$) and liquid water is 3921 calories per gram molecule, which is equivalent to 41.1 B.t.u. per lb. of gypsum. Pure $CaSO_4 \cdot \frac{1}{2}H_2O$ contains 6.2% combined water. In practical operations gypsum is calcined to a chemically combined water content averaging 0.5% less than the theoretical. Under average operating conditions this will approximately equal the loss of 0.15 lb. of water per lb. of gypsum.

3. The heat required to evaporate 0.15 lb. of water at mean average temperature of 260 deg. F. is 0.15 × 937 = 140.5 B.t.u. per lb.

Summary

	B.t.u. per lb.
1. Heat required to raise temperature of gypsum to 340 deg. F.	= 67.6
2. Heat absorbed in decomposing gypsum	= 41.1
3. Heat required to evaporate H_2O.	=140.5
Total B.t.u. required per lb. $CaSO_4 \cdot 2H_2O$	=249.2

249.2 × 2000 = 498,400 B.t.u. per ton gypsum, $CaSO_4 \cdot 2H_2O$.

249 ÷ 0.85 = 293.2 B.t.u. per lb. calcined gypsum, $CaSO_4 \cdot \frac{1}{2}H_2O$.

293.2 × 2000 = 596,400 B.t.u. per ton calcined gypsum, $CaSO_4 \cdot \frac{1}{2}H_2O$.

Furnace efficiency is calculated as follows:

$$\text{Furnace efficiency} = \frac{\text{Theoretical heat required}}{\text{Actual heat used}} \times 100$$

Reply to the Article by Alton J. Blank On Ignition Losses

By Katsuzo Koyanagi
Chichibu Cement Co., Ltd., Tokyo, Japan

IN AN ARTICLE, "Analysis of the Article by Katsuzo Koyanagi on Accounting for Ignition Loss," etc., which appeared in the October 25 issue of ROCK PRODUCTS, Alton J. Blank gives some discussion of my article which was published in the August 16 issue of the same journal, and says: "(1) It remains difficult to understand the difference in the ignition losses of cements in my original experiments on 'Iron Oxide vs. Alumina as a Fluxing Agent in the Manufacture of Portland Cement,' which is shown to increase from one experimental clinker to the other, unless there was a difference in the degree of hardness, to which successive experimental clinkers were burnt. If all clinkers were burnt to the same degree of hardness, their affinity for the absorption of moisture from the atmosphere during storage should be the same. In the case of clinkers No. 4 and No. 5, which were burnt so hard that preliminary crushing was necessary in order that they be reduced to the proper fineness in the mill, it is not easily understood why their affinity for moisture absorption should be greater than the preceding clinkers, since it seems entirely unlikely that the harder a clinker is burnt the greater will be its affinity for the absorption of atmospheric moisture."

The writer's discussion of this first paragraph of item (1) is as follows: Alton J. Blank doesn't take into account that the moisture absorbed by clinker from the atmosphere during the storage is a function of two factors: (1) the quantity of moisture in the atmosphere, and (2) hardness of burnt clinker. Clinker absorbs more moisture in the moist atmosphere than in dry atmosphere. A harder burnt clinker may sometimes absorb more moisture than a soft burnt one, if the former is stored in an atmosphere which contains much more moisture than the atmosphere in which the latter is stored.

As I stated in my article, "Accounting for Ignition Loss," etc., the burning tests of my original experiments began in February when the atmosphere in this country is the driest in the whole year, the humidity being 40 to 60. The moisture increases gradually with the months until it reaches 100 in June, which is the rainy season. It is very natural and easy to understand that the moisture in stored clinker increases gradually with increasing atmospheric moisture.

Mr. Blank finds that the harder the clinker burnt, the less the affinity for absorbing moisture. I give approval to this opinion of Mr. Blank. On this account, the writer has also carried out an extensive experiment which has been already reported to ROCK PRODUCTS under the subject "Free Lime in Portland Cement Clinker and Soundness of Cement," which will be published in this journal in the near future. In this article the writer tried to determine the degree of burning of clinker by measuring the porosity of fresh burnt clinker, comparing it for soundness and strength of the finished cement, and he reached the same results as Mr. Blank. But, as I stated before, the moisture absorbed by clinker depends both upon the amount of moisture in air during storage and the hardness of clinker, so the loss in ignition of stored clinker doesn't necessarily show the degree of burning only.

In the second paragraph of item (1) Mr. Blank states that he has never found a portland cement whose strength qualities are bettered upon storage, whether under humid or dry atmospheric conditions.

We have quite opposite experience from Mr. Blank's; we take hourly samples of cement at the outlet of mills and at packers and we test every day the mean sample of these cements for strength. We find the mean strength of one month of the cement which has been stored some time after grinding always a little higher than that of fresh ground cement. We carried out also many tests on the effect of storage upon the strengths of cement and we find always that storage of moderate length is effective in increasing the strength quality of cement, or at least it is not harmful.

(2) With regard to the calculation of lime ratio: Mr. Blank says that the formulas which I reported in the original and the second article are different, so this is also misprint from the original paper.

We understand lime ratio or hydraulic modulus of the cement always equals the total lime minus lime in gypsum added divided by SiO_2 plus R_2O_3.

We believe the value of my original experiment is not the least affected by such a trafle. We leave it to the judgment of people who have the "common sense of the cement chemist."

(3) Notwithstanding my earnest desire to know the results of Mr. Blank's experience upon effect of sulphur in the raw mixture on the strength of cement more in detail, especially the content of sulphur in the raw mixture, Mr. Blank will not go into this question. I express a great regret for it.

Mr. Blank requests me in conclusion to give my experience on the effect of atmospheric moisture upon kiln operation, but this will not be gone into because it extends beyond the range of our present discussion.

New Method of Procedure in the Analysis of Lime in Samples Fused with Sodium Carbonate

By W. P. ECKDAHL

IN PRECIPITATING CALCIUM OXALATE in presence of soda salts, sodium oxalate is incorporated in the colloidal precipitate and can only with repeated reprecipitations, be removed. This is more noticeable in high calcium contents and affects the volumetric determination to a greater extent than gravimetric.

To purify the precipitated calcium oxalate, it is filtered, washed five or six times with warm water, ignited to the oxide, redissolved in 1-1 HCl to small volume, made ammoniacal and the lime precipitated as a carbonate with ammonium carbonate.

Filter and wash with ammonium carbonate water.

Dissolve the precipitate in HCl acid and precipitate the calcium oxalate in the usual manner for gravimetric or volumetric determination.

Determination of Calcium and Magnesium in Dolomitic Limestones by Means of Saccharate Solutions

A NEW RAPID and accurate alkalimetric method for the determination of calcium and magnesium in low-iron dolomitic limestones is described in an article by A. C. Shead and B. J. Heinrich, University of Oklahoma, Norman, Okla., in *Industrial and Engineering Chemistry*, October 15, 1930.

The method consists in igniting a weighed sample (0.5 gram) to constant weight at 900-1000 deg. C., then slaking to $Ca(OH)_2$, and adding a measured amount (100 cc.) of 30% cane-sugar solution, which forms a monocalcium saccharate with the calcium, leaving the magnesia insoluble. The solution is then filtered and the insoluble magnesia treated with a measured amount of undiluted standard acid until digested, then the excess acid titrated back with standard alkali, using phenolphthalein as indicator, and the percentage of magnesium oxide calculated.

The calcium cannot be determined accurately by direct titration of the monosaccharate, hence is determined indirectly by digesting a weighed quantity of the magnesium limestone with excess standard acid and titrating back with standard alkali as before, from which result the combined MgO and CaO are calculated, the difference between this value and the MgO value giving the CaO value.

The results obtained in this way were in very close agreement with the classical gravimetric procedure, and the total time required was from 3 to 4 hours. Both the ignition and filtering are done in an apparatus arranged to exclude CO_2.

Government Control of Spanish Portland Cement Industry

THE PRODUCTION, DISTRIBUTION AND PRICE of portland cement in Spain are controlled by a government commission. The full title is "Comision Asesora con Caracter De Junta Reguladora E Inspectora de la Industria del Cemento." In a report made to the Ministerio De Fomento, an office which seems to have part of the duties of our Secretary of Commerce and part of those of our Secretary of the Interior, the way in which the commission was formed and a scope of its work are described.

According to this report, the Spanish portland cement industry began in 1900. For the first ten years there was little demand for the product. In 1910 it began to be more widely used, especially in public works, and then the industry began to develop slowly.

During the war, and even more in the period just after the war, there was a great increase in the use of portland cement; but even though conditions were favorable for a rapidly increasing use, production facilities grew faster than consumption. Overproduction varied from 20 to 40%. This continued until 1928 when a plan for building public works on a large scale made a radical improvement in the market. The effect of this was seriously considered by the Ministerio de Fomento, which wished to avoid the disturbance which would come from an excessive building of new plants. So during the development of the new building plan he offered exclusive concessions to existing plants, provided they would, as a syndicate, guarantee quantities, quality and reasonable prices.

Too Much Restriction of Output

While these arrangements were being made, authorization for building new plants and enlarging old plants was suspended. It followed that for the first time consumption exceeded production and the importation of 300,000 tons of foreign cement with reduced duties was authorized by royal decree. It will be remembered that at this time Spain was governed by the dictator Miguel Primo de Rivera, and all the decrees, copies of which are given in the report, were signed by him as prime minister.

In this situation it seemed necessary for the state to intervene, not only because it was the principal customer for cement, but in order to see that the industry developed in such a way that the whole country might be supplied with cement at a reasonable price but without stimulating business so much that the industry would be ruined at the time when it should be most successful. Hence the commission was created to oversee the production and sale of cement so that these would be conducted in the best interests of both the established industry and the consumers, and that the makers of good cement would not have to compete with inferior products.

There are ten members in the commission. The president and two others are either civil engineers or mining engineers and directly represent the Ministerio de Fomento. An industrial engineer represents the Ministry of National Economy. Three others directly represent the manufacturers of cement and the remaining three, who are engineers or architects, represent the contractors.

Commission Rule of Cement Industry

The commission has power to authorize the enlargement of the existing plants and the building of new plants, proportioning the capacity to the local market. It also considers the proposals of local administrations, or their delegates, who wish plants built in their localities. It decides on methods of production and proposals to modify them. It looks after the quality of the product and conducts a central laboratory for analysis and research. It considers facilities of transportation and studies prices and preventative or coercive measures for modifying bad market conditions. And with many other things, it studies the cement industry throughout the world to assure that the Spanish industry will compare well with that of other countries. The result of such study forms a considerable part of the report.

Cement Industry in Other Countries Compared

A Swiss report is quoted to show the standing by quality of cements made in seventeen countries. Spain ranks sixth and the United States eighth. England, Norway and Germany take the ninth, tenth and eleventh positions. Denmark is the leading country and France second, according to the classification of the Swiss authorities.

Although Spanish cement mills are modern and well conducted the report says the cost of manufacture is found to be higher than in some other countries. Raw materials cannot usually be obtained as cheaply, machinery must be imported and duties paid on it and coal costs about twice what it costs in Belgium and England. Coal consumption is stated to be 25% to 30% (94 to 113 lb. per bbl. of cement.) Horsepower costs 8 to 10 pesetas per ton (about 10c per bbl.) using from 100 to 110 kw. hr. per metric ton. Large mills, which would reduce the price by reducing overhead, cannot be built on account of transportation and market conditions.

Having all this in mind the report says that the current price in 1928 of 105 pesetas per ton ($2.44 per bbl.) is very reasonable. To sustain this conclusion prices in other countries are given. The average of the French prices is $1.66 bbl., of the English prices, $1.60, of the Swiss, $1.70. For the United States figures are taken from Rock Products market pages. The range is given from 70 to 96 pesetas per ton ($1.62 to $2.22 bbl.). [Exchange has been figured at 7.20 pesetas equal $1, the rate given in the report. Six barrels are taken as equal to one metric ton.—Editor.]

Size of Spanish Plants

The remainder of the report is mainly statistical. One table shows that the twenty-one Spanish mills produced 328,529 metric tons in 1920 and that production rose steadily to 1,556,861 tons in 1929 (from about 1,970,000 bbl. to about 9,340,000 bbl.). Production for some individual plants is small, according to American standards. Eight of the twenty-one companies have capacities around 180,000 bbl. per year, most of these having vertical kilns, although some have one rotary kiln each. One white cement company produces 180,000 bbl. annually. The largest producer is the Compania General de Asfaltos y Portland "Asland," which has four plants that made 3,600,000 bbl. in 1929. One of the larger companies produces 660,000 bbl. annually from seven vertical kilns. The average production per plant in 1929 was about 450,000 bbl., taking one set of figures in the report, although another would place it somewhat higher.

Consumption Curve Rises in 1927

In a graph of Spanish production and consumption the curves are practically identical until 1927 when consumption (and the importation of cement) rises. The report says that it is by drawing a straight line rectifying the production and consumption curves that the future market for cement has been calculated. Permission to build new plants and enlarge old ones is based on this calculation. But it is recognized that plant capacity must always be greater than consumption. A survey of the cement producing and using countries shows consumption to be about 80% of capacity in the most advanced countries, according to the report, which the commission thinks reasonable. As to increased use, the report notes that there is a slow but steady substitution of cement for lime in construction and that the "general progress of the nation demands the incessant increase of production."

An interesting chart shows the consumption and plant capacity per capita of leading countries as of 1927. Belgium is easily first with a consumption of 371 kg. and capacity for 412 kg. The United States is second consuming 289 kg. with a capacity for 387 kg. per inhabitant. Spain is 15th in the list with a consumption of 45.5 kg. and a capacity for 58 kg., about 27% more than the consumption. Switzerland, Austria and Roumania have about twice the plant capacity required for their consumptions.

Maps show Spanish plants to be placed so that every well settled part of the country can be supplied by a short haul. The greatest of the circles of distribution drawn

about the plants has a radius of 148 km., or about 92.5 miles. Naturally the plants are more numerous near the larger centers of population, Balboa in the north, Barcelona in the east, Malaga and Seville in the south and Madrid in the center of the country.

Providing More Production

The commission states that in order to avoid the importation of 300,000 tons of cement as soon as possible it has given preference to enlargements of existing plants. A table of authorizations shows that permission to enlarge plants to an added annual capacity of 331,000 tons (1,986,000 bbl.) has been granted to twelve existing plants. Erection of the following new plants has been authorized.

Plant	Tons	Bbl.
Asland Cordoba	70,000	420,000
Electro Quimica de Flix	10,000	60,000
Cementos Portland de Morata de Jalon	60,000	360,000

The company Electro Quimica de Flix makes only alumina cement.

Appendices to the report give the national specifications for portland cement, high strength (alumina) cement, slag cement and natural cement. The portland cement specification requirements are substantially those of the American A. S. T. M. specification. As to special cements the report says that their manufacture and use throughout the world is an important feature of the way the cement industry is developing. There are several photographs of plants. These vary in appearance as much as those of the United States, some being well designed modern plants while others are a jumble of buildings, old and new. There are two very beautiful bridges and some large dams in the photographs showing the use of portland cement in public works.

Bureau of Standards Specifications for Light Railway Track Scales

SPECIFICATIONS for the manufacture and installation of railway track scales for light industrial service, for knife-edge scales only, have been prepared and published by the U. S. Bureau of Standards in Circular No. 386, October 24, 1930.

These specifications were made up by a committee appointed and sponsored by the National Scale Men's Association, with the aid and co-operation of the American Railway Engineering Association, Scale and Balance Manufacturers' Association, and the Bureau of Standards, and cover one class of scale known as light industrial service railway track scales, 46 ft. long, of the 4-section type, with a sectional capacity of 50 tons.

Copies of the specifications may be obtained at a price of 5 cents each from the Superintendent of Documents, Washington, D. C.

Salvage—An Important Function of Good Management

By W. R. Cliffe

Superintendent, American Lime and Stone Co., Bellefonte, Penn.

AS MANAGEMENT has within the five years just passed come to recognize the importance of the Safety Movement, so it now recognizes the value of Salvage. Many of the largest and most important industrial concerns throughout the country have been aware of the possibilities of salvage since the war, and in some instances gigantic savings have been effected through the utilization of waste materials. In some instances, with the aid of chemistry, reclaimed industrial waste, like a child, has grown in importance until the profit derived therefrom has supplanted that of the parent industry.

The word salvage, as we think of it, covers a broad field. The dictionary explains its meaning in these words: "That which is rescued from shipwreck—also compensation to the rescuers." If we can picture waste in terms of shipwreck, the definition is quite appropriate. To amplify this thought, as it applies to modern industry, we might think of salvage as elimination of waste effort, and the utilization of material that would ordinarily be discarded. Like all effort salvage can be carried to extremes, and then cannot be justified; therefore, it must come under the category of economics.

Required—A Sense of Values

A director of salvage to be efficient must have a fine sense of the true value of things. Suppose, for instance, a part shows a degree of wear, which warrants its removal and discard. In this connection two phases must be studied. First: possibly for a fraction of its original cost, the part can be reconditioned. If so, do you have a system that will record its value as a replacement? (Time in service.) Second: Possibly by a simple change in design it can be made to serve some other useful purpose, thereby saving, for the time at least, the purchase of the part replaced. Material seldom wears to a point where it is not worth more than the junk man will allow for it.

Salvaging Waste Brings Great Satisfaction

Salvage thoughts are worthy of the best minds of industry, and nothing in the writer's estimation carries with it quite the feeling of personal satisfaction as does the discovery of a use for a product that was formerly discarded, or the economical repair of material to avert the purchase of new parts.

There is a fascination in connection with salvage which makes the movement comparatively easy to instill into an organization. Few workmen are intentionally wasters, and the response to educational methods along this line by a loyal group will be surprising. However, no matter how earnest an organization may be in its efforts in this direction, one man with a broad knowledge of the company's business should make it a point to arrange for any material consigned to the rubbish pile to pass under his inspection. When it becomes known that "the Boss" has his eye on the scrap pile, departmental pride will make itself apparent with interesting results.

Prevention of Waste Primarily the Manager's Responsibility

Management which has never given thought to the elimination of waste is apt when the subject is mentioned to declare: "There is no waste in our shop." However, for such it is suggested that someone outside the organization who is competent to recognize waste when he sees it, be invited to make a survey of the company's property and methods. The results obtained are likely to cause the management to show considerable interest in this field.

Failure to profit through the practice of salvage is not the workman's failure. The responsibility must be laid at the door of management. A modern well paid organization will in this case, as in all cases, respond freely to a perpetual campaign for waste elimination. The first step to be taken in this direction is to arrange in as simple a manner as possible to segregate anything discarded so that it is at all times visible and acccessible. Through making the conservation of material an issue, many interesting features will be developed. The surface has just been scratched in this movement, as time is an important element in connection with the determination of results. However, perseverance and experience will prove the experiment well worth anyone's effort.

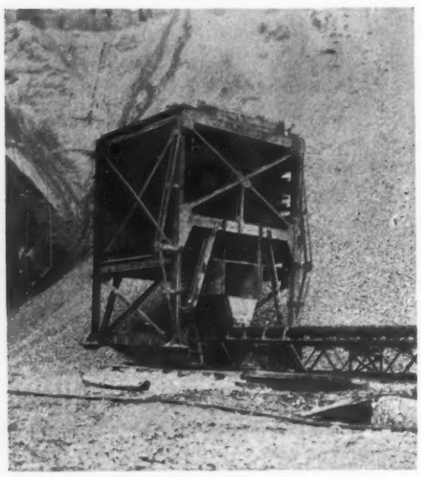
Resultful Collection Letters Part of Cement Company Service

GETTING THE MONEY and yet maintaining the good will of the customer requires diplomacy of a high order. The average run of material dealers always welcome suggestions, and that's why the collection letter service offered by the Universal-Atlas Cement Co. is so popular. In a recent issue of *Printers' Ink*, Murray Moxley of the Universal-Atlas organization contributes an article on the subject. A suggested letter is reproduced in Mr. Moxley's article.

Hints and Helps for Superintendents

Portable Field Hopper

THE PIONEER SAND AND GRAVEL CO., Steilacoom, Wash., uses a portable track hopper to receive the gravel from the



Hopper feeding belt conveyor

No. 125 Marion electric shovel using a 4-yd. dipper. The steel hopper straddles a belt conveyor which it feeds by a short belt feeder that acts as the bottom of the hopper. The conveyor is made so that 39 ft. lengths may be added from time to time as the pit workings extend farther into the deposit. The hopper rides an industrial track with the conveyor centered between the two rails, so that the feed hopper is as mobile as the crawler treads under the shovel.

A Gravity Unloading System for Sacked Cement

WHERE MANY SACKS of cement are to be unloaded from cars and stored or used, a practical unloading system can be installed at little cost. To work well and deliver the cement to some point 50 ft. or more away from the freight car, the railroad siding should be on an embankment several feet above the spot to which the sacks are to be delivered. At the ready-mixed concrete plant of the Champaign Builders Supply Co. of Champaign, Ill., the mixer is located at a point about 100 ft. away from the railroad siding and somewhat lower down, since the tracks run on a high fill at that point. Between the track and the mixer a wooden trestle, about 4 ft. in width, has been built. This has a down grade from the siding to the mixer, which allows the material to be delivered by gravity.

On the trestle has been laid a pair of tracks made out of some old 2-in. angle irons. On each of these tracks is a small car about 4 ft. long and 18 in. across and these are joined together by a light cable which passes around a grooved pulley at the upper end of the incline. The cable is just long enough so that when one car is at the mixer the other one is at the top of the incline.

In operation several bags of cement are placed on the car at the upper end of the incline and their weight carries the car down to the mixer, while the counterbalanced empty car is drawn to the top of the incline. The empty car is then loaded and the process repeated. The gentleness of the grade prevents the cars attaining excessive speeds. The two cars have been christened "Jack" and "Jill" and they bear these names painted on their sides as they go up and down the hill.

Such a device could be installed even where there is no difference in level between the track siding and the point where the sacks are to be piled. Because the floor of a freight car is some 4 ft. about the track there would be sufficient drop for an incline of considerable length. If necessary, the

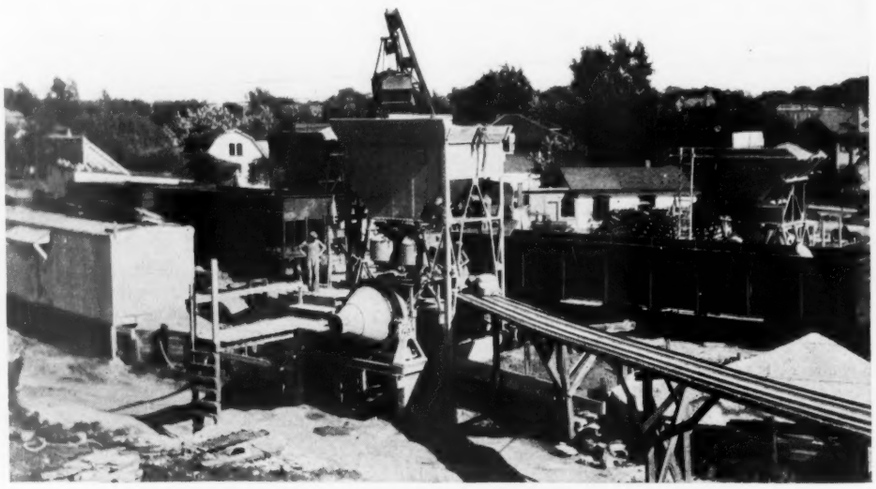
Upper end of unloading trestle

incline at the upper end could be slightly above the level of the car floor so that an increased gradient for the incline can be obtained. This system could also be used for taking cement from a storage platform down to the mixer. At the Champaign plant it is used for this also, as the storage space is placed at the head of the incline just beside the railroad siding.

Satisfactory Solution of a Drinking Water Problem

By J. Palmer Camm
Watonga, Okla.

ALL PLANTS OR QUARRIES must supply drinking water for their workmen. To some this presents no problem whatever. They may have steam shovels in their quarries. This will require large quan-



Two-track trestle equipped with pair of counter-balanced small cars carries cement from box car to mixer by gravity

tities of good water brought to the quarry, as most plant operators see that the boiler receives good water, assuming that the water contains no harmful bacteria. Again, the quarry may be sufficiently close to the main water supply that the cost of piping water to the quarry is not prohibitive regardless of whether or not a steam shovel is used.

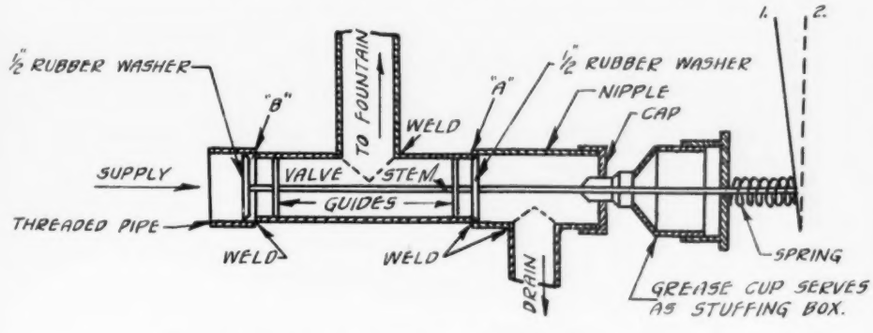
To other and in particular smaller operators, the problem is quite different. This is especially true where the quarry is at too great a distance from the main water supply to lay pipe to the quarry. Such is the situation in our case. Formerly we kept a keg in the quarry for drinking water. When the keg was empty it was sent a half mile to the source of water supply for refilling. Furthermore the common drinking cup was much in evidence. The problem was as much to rid ourselves of this unsanitary condition as it was to keep water in the quarry. We finally decided the best way to transfer water to the quarry was in cream cans. They had to be kept closed at all times and washed out frequently. To get rid of the drinking cup the fountain was left as our goal.

First we had no pressure system to connect with. We could have placed the water container above the fountain, but we did not want to do this on account of placing the water and ice in the container. A second consideration was the fact that the fountain would be outdoors during the winter. This presented the problem of keeping the fountain supply pipe from freezing. To do this necessitated a stop and waste valve easy and positive in its action. As regards the pressure problem, we first tried air pressure on the water container, thus forcing the water to the fountain. This was not very successful on account of a hard-working, hand-operated air pump, and too much time was lost in pumping up pressure. We next tried placing a small hand-operated water pump in the line from the water reservoir to the fountain. This worked successfully. The water pump cylinder holds approximately one pint. On the up stroke of the pump handle water is drawn from the reservoir. On the down stroke water is forced to the fountain. Two check valves, one between the pump cylinder and the reservoir and the other between the pump cylinder and the fountain, serve as pump valves. Ice is kept in the reservoir. In this manner we have eliminated use of the common drinking cup.

We could not find a suitable stop and waste valve, so we constructed one for our purpose as illustrated herewith.

When lever is in position 1, valve is closed at *a*, and open at *b*, allowing water to go to fountain. When lever is in position 2, valve is closed at *b* and open at *a*, allowing water to drain out of fountain, thus preventing freezing.

This proposition avoids the necessity of drinking from a water pail, which is still a common practice. Health of the workmen should be of primary importance.



Showing method of supplying drinking water at quarry

Belt Conveyor Feeder

THE STANDARD GYPSUM CO. brings its gypsum into Long Beach, Calif., by steamers from Mexico. The boats are unloaded by a gantry crane that discharges to a feeder that is mounted on the crane itself.

Reciprocating belt feeder

Some of the gypsum, however, is unloaded by the ship's gears, a nautical term, which in land-lubber English means a clamshell operated from steam hoists mounted on the deck of the ship. One or more of these rigs can be operated if desired, but it is more common only to use the main gantry clamshell and one of the ship's clamshells. The latter discharges to a reciprocating pan feeder mounted on industrial rails. The feeders from both the unloading clamshells discharge to a belt conveyor running just under the floor deck of the wharf.

The feeder is driven from a direct-connected motor through a set of gears with a flywheel mounted on one of the shafts of the gear train. Before the flywheel was installed the pan had a jerky motion, but now operates very smoothly.

Safety guard for crusher man

Safety for the Crusher Tender

MOST PLANTS do not have any safety precautions around the tops of the gyratory crushers, although at some places there is a rope in evidence for the crusher man to hang on to while working on the rocks that clog a crusher opening. A better scheme is used at the crusher of the Northern Gravel Co. at Barton, Wis. Here a steel hoop is suspended over the crusher from an I-beam above. There are four ropes to support the hoop and these are allowed to hang down loosely over the crusher. The hoop is high enough above the crusher to be entirely out of the way, but the ropes hang down enough so that they can be easily grabbed should a man slip on the edge of the crusher. With four ropes to reach for a man is certain to get a good hold on one.

This I-beam used for suspension of the hoop at the Northern company's plant was that used for a hoist installed above the crusher, similar to those found above crushers at many plants. The suspending ropes were merely attached to the beam by a hook through a hole, so that the utility of the hoist was in no way impaired.

One Good Roads Advocate Who Dares Speak Out His Preferences

CONCRETE PAVING for 78% of the state highway system now otherwise surfaced and a "proper charge" against freight trucks for their use of state highways were demands made by J. J. Donovan, Bellingham lumberman, in calling the thirty-first Washington State Good Roads convention to order recently.

Mr. Donovan also appealed for a "fair trial" of the action of the 1929 Legislature creating a state highway director reporting to the governor and through him to the Legislature.

Digressing from the subject of state roads he urged county commissioners to make locations possible for people coming west by improving secondary roads.

"The modern pioneer stops with his flivver at the end of the road. We need more people. There are too many in the East—not enough in the West," he said.

He quoted Frank Terrace, former president of the association, as declaring freight trucks, "5% of the traffic," were "hammering to pieces roads built for 95% of the traffic" and added that, as competitors of railroads, "they are responsible for the reduction of millions in taxes, which the railroads are proving in the courts.

"Let the heavy auto freight trucks pay a proper charge or build their own line," Donovan said.

"We must spend many millions and at least ten years concentrated effort before the state road system, agreed to by the 1912 Legislature and calling for 3268 miles of roads connecting every county seat, can be completed, with a minimum of 20 ft. of concrete."

Describing concrete as the only "permanent surface," he said less than 22% of state roads were paved with that material.

"We have eliminated dust on 945 miles by use of heavy oil and should continue on 1200 miles more but this is only a palliative until the roads can be paved," said the speaker.—*Seattle* (Wash.) *Times.*

Montana Phosphate Company Gets Big Contract

A MINE which now appears will develop into one of the large mining properties in Montana is being opened up on the William Anderson ranch, 22 miles northwest of Deer Lodge, where a high grade of phosphate of lime rock is being mined by the Montana Phosphate Products Co.

The mine, owned by Mr. Anderson and operated by the Montana Phosphate Products Co., is working on a 100,000 ton order for the Consolidated Mining and Smelting Co. of Trail, British Columbia, and 100 tons a day are being shipped from a switch on the Milwaukee railroad about four miles west of Garrison.

Mr. Anderson, vice-president of the operating company, located the vein of phosphate on his ranch after two years' diligent search. Tunneling into the mountain, Mr. Anderson ran on the vein about 60 ft. from the surface and found it from 4 to 5 ft. thick with a 30% dip. From this point the rock is stoped out. Three tunnels are now being operated with 16 miners to fill the Canadian contract. The rock extends for a distance of two miles or more on the Anderson property, according to Mr. Anderson, and an estimate made by engineers places total phosphate available from the present level at 2,000,000 tons. No exploration to ascertain the depth of the vein has been made. Assays of his rock give returns of 77% b.p.l., highest grade of this class of rock known, according to Mr. Anderson.

A shipment of 1000 tons was made to a smelter at Sidney, Australia, recently, for experimental purposes. Shipments have also been made to the Anaconda smelter.

To produce the 100 tons of rock per day 16 men are employed in the mines, while three trucks operating 24 hours a day carrying three tons to a load cart the ore to the cars. Between 10 and 15 men are employed erecting buildings, ore bins, cutting stulls, etc.

The 100,000 ton contract for the Trail, B. C., smelter, will be completed by January 1, 1931, when the new $10,000,000 smelter of the Consolidated Mines Co. will be completed and start operations, using 100 tons a day of the Powell county shipment. The phosphate product after treatment by the smelter, will be known as "Treble Super-Phosphate" and sell for from $35 to $45 per ton, said Mr. Anderson.

D. P. Knowles, a mining engineer, representing the Consolidated Mines Smelting Co., and Roy Scott of Seattle, representing Montana Phosphate Products Co., were in Deer Lodge making daily trips to the mine, where they were actively engaged in caring for the interests of their companies.—*Deer Lodge* (Mont.) *Post.*

Plans for Tulsa, Okla., Cement Plant Said to Be Progressing

PLANS AND SPECIFICATIONS for the cement plant of the Missouri Portland Cement Co., which is to be constructed on a site in the east section of Tulsa, Okla., have now been completed and the contract should be let soon after January 1, according to information secured from the officials at St. Louis by C. L. Dewey, industrial commissioner of the Chamber of Commerce. He says present plans call for the completion of the plant by October 1, 1931.

Delay was occasioned, Mr. Dewey states, by officials of the company making a trip to Europe to investigate certain improved features in cement manufacture which they desire to incorporate in the Tulsa unit.—*Tulsa* (Okla.) *World.*

Idaho Cement President an Optimist on Northwest If Not on the East

EUGENE ENLOE, Spokane, Wash., capitalist and president of the Idaho Portland Cement Co., with Mrs. Enloe returned recently from a month's visit to New York and Boston.

"Conditions in Spokane as compared with the industrial sections of the east are so much better that we have everything to be thankful for," said Mr. Enloe. "From New York to Boston stretches an almost continuous industrial district, grouped about the cities, with more or less severe conditions of unemployment. There is hardly a cow, dairy or chicken ranch to be seen and the soil seems to be poor and worn out. Everything is factories and warehouses and when these institutions have nothing to do it is tough on the people living there.

"I can not see this talk of high wages by Henry Ford. The men who run shoe factories around Boston will have to make their shoes for less if we people of the west are to buy them with wheat at 50 cents a bushel.

"Coming across southern Indiana on the Baltimore & Ohio railroad I was rather impressed with the impoverished and run down condition of the farming districts, which reminded me somewhat of what I saw in New England. Around my old home at Greenville, people were faring better. They live pretty much as they did 40 years ago when I was there. They do not have much money but they have plenty to eat and wear and seem prosperous.

"My solution for the economic situation is that more of these city men will have to go to the farm. Prices of farm stuff may be low but they can raise something to eat. The country will have to raise more hogs, cows and chickens and get back to a substantial producing basis. Back east the campaign cry is 'buy something,' but it is hard for the peope there to buy when they have no money.

"I found things at the Idaho cement plant running along in a most satisfactory manner. The plant has been in continuous operation since last spring, with the exception of one or two shutdowns for repairs and will continue to run until hard freezing sets in. We will produce this year around 165,000 bbl. of cement and have operated at a profit. I have told my Spokane friends who are stockholders in the plant that if they want to sell I will pay them what they invested in their stock, without interest, regardless of what the stock market may have done."—*Spokane* (Wash.) *Spokesman-Review.*

Universal-Atlas Opens Milwaukee Distribution Plant

THE NEW HALF-MILLION DOLLAR distribution plant of the Universal Atlas Cement Co. was added to Milwaukee's industry on November 20.

Editorial Comment

A Xmas Message

Some nineteen hundred years ago there lived One who taught mankind both by precept and example mankind's noblest conception of itself. Almost alone, unaided by worldly office, position, wealth or influence, a member of a captive and derided race, He set forth with sublime courage, fortitude and self-confidence to change the entire course of humanity, with a gospel or philosophy of a universal brotherhood in which love and kindness and goodwill shall triumph; a philosophy that teaches of the joy and peace of mind which comes to those who freely give to bring peace and joy and comfort to their brother men.

OUR PLATFORM

¶ Greater Economy of Production; the Best in Machinery, Control Equipment; High Wages; Perfect Co-ordination. ¶ Comprehensive Organization of Industry for Research, Promotion. ¶ Retirement of the State from Competition with Private Business. ¶ Active Participation of Business Men in the Business of Government. ¶ The Promotion of Safety and Welfare of the Industry's Employes.

Nineteen hundred years is a short period of time measured by mankind's tenure of this earthly planet; it is a long time measured by most human institutions we are familiar with; it is a very long time measured by the length of an individual human life. We have no real perspective. Yet most of us realize the changes that have come about in business and industry, even in our own brief span of business life. Most of us undoubtedly believe industry has progressed in many ways besides achievements in mass production, in new products of research and invention. We believe there has been a progressive change in the philosophy of management and ownership — with a resulting fairer distribution of the profits of industry. We can see a growing appreciation of the responsibility on the part of owners and managers for the safety and welfare of employes. We believe we see an awakening of conscience, which is making clearer the distinction between honest, honorable methods of business conduct and those which are neither. In short, most of us believe that real progress has been made in softening man's inhumanity to man.

With this background we are not surprised that for the first time in history industry is very generally assuming its moral responsibility for unemployment and the human misery it brings; is endeavoring in a great variety of ways to aid those out of employment, or in danger of being out of employment. Industry indeed seems to be slowly but definitely approaching that goal where it will universally be recognized as no longer impersonal and inhuman. As Jesus of Nazareth said of the Sabbath: "The Sabbath was made for man, not man for the Sabbath"; and we can imagine He would say of industry: "Industry was made for man, not man created for industry."

So, it can be no mere coincidence that the last few years have been years of plenty, of industrial peace, harmony and understanding, and that industry has become a pleasure as well as a necessity to most of us. That we took our good fortune too much for granted and became improvident is only too true; but after all it was human frailty to do so. If those who now suffer the miseries of poverty were shortsighted in not making greater provision for the future, so much more so were their employers, who should have been wiser, who failed to provide the security of employment that may justly have been expected of them as the managers of industry and in the aggregate the masters of its destiny.

In a large way it is immaterial what is the immediate cause of this business depression, and of all business depressions, which beget human misery and suffering. We know only that there is food and clothing enough in the world, or at least enough food and clothing can be produced, to keep all from death through cold and hunger. The great majority of mankind is happier and healthier when it is able to earn its way, and obviously the ultimate function and duty of industry is to provide man with the means of supplying his own wants. When industry fails to do so, it seems to us equally the duty of industry, and of those whom industry has provided for, to extend a generous and helping hand to these victims of industry's maladjustment—or perhaps indeed, by and large, its mismanagement.

Discussions of industry may concern business economics or ways and means of eliminating the peaks and valleys of the so-called business cycle. It may concern codes of ethics, or codes of fair business practice. It may frankly concern ways of legitimately obtaining a fair and profitable price for a commodity. But all these subjects are no longer discussed solely as individually selfish objectives. Men of industry nowadays really are concerned with the effect upon their employes and upon the public welfare of their business principles and policies.

That such a humanitarian conception of industry is slowly gaining ground there can be no doubt. It can only be attributed to the steady and progressive acceptance of the philosophy of Jesus, of man's recognition of his responsibility to his brother man, to society, according to his position and influence in society—and in industry, which forms so large a factor in modern society and civilization. There is no question of the goal: Industry must be made the slave of mankind, not mankind the slave of industry. So let us remain true to form, and as ever in times of adversity, devote our thoughts and energies to strengthening our moral fibre and to gaining a clearer conception of the meaning of life, of civilization, of industry.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[29]	12-15-30	80	.....	
Alpha P. C. new com.[6]	12-13-30	14	16	50c qu. Jan. 24
Alpha P. C. pfd.[2]	12-13-30	116	121	1.75 qu. Dec. 15
American Aggregates com.	12-17-30	10	13	75c qu. Mar. 1
Am. Aggr. 6's, bonds	12-17-30	73	75	
American Brick Co., sand-lime brick	10- 6-30	4½	.....	25c qu. Feb. 1
American Brick Co. pfd.	12-15-30	46	50	50c qu. May 1
Am. L. & S. 1st 7's[29]	12-15-30	96½	.....	
American Silica Corp. 6½'s[49]	12-16-30	No market		
Arundel Corp. new com.	12-15-30	37¼	38	75c qu. Oct. 1
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)*	12-16-30	No market		
Beaver P. C. 1st 7's[20]	12- 1-30	93	96	
Bessemer L. & C. Class A[4]	12-12-30	25	30	75c qu. Nov. 1
Bessemer L. & C. 1st 6½'s[4]	12-12-30	92	95	
Bloomington Limestone 6's[39]	12-15-30	.....	55	
Boston S. & G. new com.[47]	12-12-30	16	18	40c qu. Oct. 1
Boston S. & G. new 7% pfd.[47]	12-12-30	45	50	87½c qu. Oct. 1
California Art Tile A	12-11-30	2	5½	43¾c qu. Mar. 31
California Art Tile B[50]	12-12-30	.....	5	20c qu. Mar. 31
Calaveras Cement com.	11-28-30	.....	12	
Calaveras Cement 7% pfd.	12-11-30	.....	81	1.75 qu. Oct. 15
Canada Cement com.	12-15-30	.....	12½	
Canada Cement pfd.	12-15-30	.....	92	1.62½ qu. Dec. 31
Canada Cement 5½'s[43]	12-12-30	99	100½	
Canada Cr. St. Corp. bonds[52]	12-12-30	93¾	97½	
Certainteed Prod. com.	12-15-30	2½	3	
Certainteed Prod. pfd.	12-15-30	10	15	1.75 qu. Jan. 1
Cleveland Quarries	12-15-30	60	65	75c qu. 25c ex. Dec. 1
Columbia S. & G. pfd.	12-16-30	80	86	
Consol. Cement 1st 6½'s, A	12-16-30	No market		
Consol. Cement. 6½% notes	12-16-30	46	48	
Consol. Cement pfd.[29]	12-15-30	30	50	
Consol. Oka S. & G. 6½'s[12] (Canada)	12-13-30	99	101	
Consol. Rock Prod. com.[9]	12-11-30	1	2	
Consol. Rock Prod. pfd.[9]	12-11-30	9	11	43¾c qu. June 1
Consol. Rock Prod. units	12-15-30	7½	9½	
Consol. S. & G. pfd. (Can.)[43]	12-12-30	78½	80	1.75 qu. Nov. 15
Construction Mat. com.	12-16-30	8	10	
Construction Mat. pfd.	12-16-30	30	34	87½c qu. Nov. 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[44]	12-11-30	78	82	
Coosa P. C. 1st 6's[29]	12-15-30	48	52	
Coplay Cem. Mfg. 1st 6's[40]	12-12-30	95	.....	
Coplay Cem. Mfg. com.[40]	12-12-30	10	.....	
Coplay Cem. Mfg. pfd.[40]	12-12-30	60	.....	
Dewey P. C. 6's (1930)[30]	12-16-30	99	.....	
Dewey P. C. 6's (1931-37)[30]	12-16-30	99	.....	
Dolese & Shepard	12-15-30	.....	66	$2 qu. Oct. 1
Dufferin Pav. & Cr. Stone com.	12-15-30	.....	11	
Dufferin Pav. & Cr. Stone pfd.	12-15-30	70	80	1.75 qu. Oct. 1
Edison P. C. com.[39]	12-12-30	50c	.....	
Edison P. C. pfd.[39]	12-12-30	2	.....	
Giant P. C. com.[2]	12-13-30	5	15	
Giant P. C. pfd.[2]	12-13-30	15	25	1.75 s.-a. Dec. 15
Gyp. Lime & Alabastine, Ltd.	12-15-30	12½	12⅝	37½c qu. Oct. 1
Gyp. Lime & Alab., Ltd., pfd.	11-17-30	.....	15	
Hermitage Cement com.[11]	12-13-30	20	25	
Hermitage Cement pfd.[11]	12-13-30	80	90	
Ideal Cement, new com.	12-16-30	45	50	75c qu. Jan. 1 & 50c ex. Dec. 22
Ideal Cement 5's, 1943[33]	11-28-30	100	101	
Indiana Limestone units[29]	12-15-30	.....	80	
Indiana Limestone 6's	12-15-30	50	.....	
International Cem. com.	12-15-30	54½	55	$1 qu. Dec. 31
International Cem. bonds 5's	12-15-30	95	95½	Semi-ann. int.
Iron City S. & G. bonds 6's[46]	11- 1-30	90	93	
Kelley Is. L. & T. new stock	12-15-30	35½	39	62½c qu. Oct. 1
Ky. Cons. St. com. V.T.C.[48]	12-11-30	5	8	
Ky. Cons. Stone 6½'s[48]	12-11-30	85	90	
Ky. Cons. Stone com.[48]	12-11-30	5	8	
Ky. Cons. Stone pfd.[48]	12-11-30	75	80	$1.75 qu. Nov. 1
Ky. Rock Asphalt com.[11]	12-13-30	5	8	40c qu. Oct. 1
Ky. Rock Asphalt pfd.[11]	12-13-30	75	80	1.75 qu. Dec. 1
Ky. Rock Asphalt 6½'s[11]	12-13-30	87	92	
Lawrence P. C.[2]	12-13-30	49	55	$1 qu. Sept. 30
Lawrence P. C. 5½'s, 1942[3]	12-13-30	86	89	
Lehigh P. C.	12-15-30	13	15	25c qu. Feb. 2
Lehigh P. C. pfd.	12-15-30	98½	100	1¾% qu. Jan. 2, 1931
Louisville Cement[7]	12-11-30	175	.....	
Lyman-Richey 1st 6's, 1932[13]	12-13-30	97½	99½	
Lyman-Richey 1st 6's, 1935[13]	12-13-30	97	99	
Marblehead Lime 6's[14]	12-12-30	No market		
Marbelite Corp. com. (cement products)	11-29-30	.....	3	
Marbelite Corp. pfd.	11-29-30	.....	18½	50c qu. Oct. 10
Material Service Corp.	12-15-30	16	19	50c qu. Dec. 1
McCrady-Rogers 7% pfd.[22]	12-11-30	48	50	
McCrady-Rogers com.[22]	12-11-30	15	20	
Medusa Portland Cement	12-15-30	.....	70	1.50 Oct.1
Mich. L. & C. com.[6]	12-13-30	25	.....	
Missouri P. C.	12-15-30	25½	26	50c qu. & 50c ex. Nov. 1
Monolith Portland Midwest[9]	12-11-30	2½	3	
Monolith bonds, 6's[9]	12-11-30	80	85	
Monolith P. C. com.[9]	12-11-30	4½	5½	40c s.-a. Jan. 1
Monolith P. C. pfd.[9]	12-11-30	3½	4½	40c s.-a. Jan. 1
Monolith P. C. units[9]	12-11-30	12½	14	
National Cem. (Can.) 1st 7's[43]	12-12-30	99½	.....	
National Gypsum A com.	12-15-30	4	5	
National Gypsum pfd.	12-15-30	27	29	
Nazareth Cement com.[26]	12-12-30	13	.....	
Nazareth Cement pfd.[26]	12-12-30	95	.....	
Newaygo P. C. 1st 6½'s[29]	12-15-30	99¾	.....	
New Eng. Lime 1st 6's[14]	12-12-30	No market		
N. Y. Trap Rock 1st 6's	12-15-30	96	.....	
N. Y. Trap Rock 7% pfd.[36]	12-13-30	95	.....	1.75 qu. Oct. 1.
North Amer. Cem. 1st 6½'s	12-16-30	50	51½	
North Amer. Cem. com.[29]	12-15-30	3	5	
North Amer. Cem. 7% pfd.[29]	12-15-30	15	20	
North Shore Mat. 1st 5's[15]	12-16-30	95	.....	
Northwestern States P. C.[37]	12-13-30	105	115	$2 Apr. 1.
Ohio River Sand com.	12-15-30	.....	15	
Ohio River Sand 7% pfd.	12-15-30	.....	98	
Ohio River S. & G. 6's[16]	12-12-30	85	90	
Oregon P. C. com.[9]	12-11-30	.....	14	
Oregon P. C. conv. pfd.[20]	12- 1-30	83	86	
Oregon P. C. pfd.[9]	12-11-30	.....	95	
Pacific Coast Aggr. com.[50]	12-12-30	2	5	
Pacific Coast Aggregates pfd.	12-15-30	3	5	
Pacific Coast Cement 6's[5]	12-11-30	74	75	
Pacific P. C., new com.	12-11-30	.....	17	
Pacific P. C., new pfd.	12-11-30	68	75	1.62½ qu. Oct. 4.
Pacific P. C. 6's[5]	12-11-30	97¾	.....	
Peerless Cement com.[21]	12-15-30	6	.....	
Peerless Cement pfd.[21]	12-15-30	70	75	1.75 Oct. 1.
Penn.-Dixie Cement com.	12-16-30	2	2½	
Penn.-Dixie Cement pfd.	12-16-30	20½	25	
Penn.-Dixie Cement 6's	12-15-30	74	.....	
Penn. Glass Sand Corp. 6's	12- 3-30	101	103	
Penn. Glass Sand Corp. pfd.	12- 3-30	100	.....	1.75 qu. Jan. 1.
Petoskey P. C.	12-15-30	5½	6½	15c qu. Apr. 1.
Port Stockton Cem. com.[5]	12-11-30	No market		
Riverside Cement com.[5]	12-11-30	10½	12½	
Riverside Cement pfd.[5]	12-11-30	75½	80	1.50 qu. Nov. 1
Riverside Cement, A[20]	12- 1-30	11	14	31¼c qu. Nov. 1
Riverside Cement, B[9]	12-11-30	2	.....	
Roquemore Gravel 6½'s[17]	12-12-30	98	100	
Santa Cruz P. C. com.	12-11-30	85	.....	$1 qu. Oct. 1
Schumacher Wallboard com.	12-11-30	8	10	
Schumacher Wallboard pfd.	12-11-30	18	21	50c qu. Nov. 15
Southwestern P. C. units[44]	12-11-30	240	.....	
Standard Paving & Mat. (Canada) com.	12-15-30	14½	15	50c qu. Nov. 15
Standard Paving & Mat. pfd.	12-15-30	.....	84	1.75 qu. Nov. 15
Superior P. C., A	12-11-30	30	31	27½c mo. Jan. 1
Superior P. C., B	12-11-30	.....	10	25c qu. Dec. 20
Trinity P. C. units[37]	12-13-30	110	125	
Trinity P. C. com.[37]	12-13-30	32	.....	
Trinity P. C. pfd.[29]	12-15-30	105	110	
U. S. Gypsum com.	12-15-30	35	36	40c. qu. & 50c ex. Dec. 31
U. S. Gypsum pfd.	12-15-30	116½	124	1.75 qu. Dec. 31
Warner Co. com.[16]	12-12-30	20	30	50c qu. Jan. 15
Warner Co. 1st 7% pfd.[16]	12-12-30	96	98	1.75 qu. Jan. 1
Warner Co. 1st 6's[8]	12-16-30	97	98	
Whitehall Cem. Mfg. com.[38]	12-13-30	80	.....	
Whitehall Cem. Mfg. pfd.[38]	12-13-30	50	.....	
Wisconsin L. & C. 1st 6's[15]	12-16-30	95	.....	
Wolverine P. C. com.	12-15-30	3¼	4	15c qu. Nov. 15
Yosemite P. C., A com.[9]	12-11-30	2	3	

*See inactive securities below.

Quotations by: [1]Watling Lerchen & Hayes Co., Detroit, Mich. [2]Bristol & Willett, New York. [3]Rogers, Tracy Co., Chicago. [4]Butler Reading & Co., Youngstown, Ohio. [5]Smith, Camp & Co., San Francisco, Calif. [6]Frederic H. Hatch & Co., New York. [7]J. J. B. Hilliard & Son, Louisville, Ky. [8]Dillon, Read & Co., Chicago, Ill. [9]A. E. White Co., San Francisco, Calif. [10]Lee Higginson & Co., Boston and Chicago. [11]J. W. Jakes & Co., Nashville, Tenn. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Stern Bros. & Co., Kansas City, Mo. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Citizens Southern Co., Savannah, Ga. [18]Dean, Witter & Co., Los Angeles, Calif. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simon & Co., Inc., Detroit, Mich. [22]Peoples-Pittsburgh Trust Co., Pittsburgh, Penn. [24]A. B. Leach & Co., Inc., Chicago, Ill. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [28]Bank of Republic, Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago, Ill. [33]Boettcher Newton & Co., Denver, Colo. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney, Williams & Co., Los Angeles, Calif. [46]Stein Bros. & Boyce, Baltimore, Md. [47]Wise, Hobbs & Arnold, Boston. [48]E. W. Hays & Co., Louisville, Ky. [49]Blythe Witter & Co., Chicago, Ill. [50]Martin Judge Co., San Francisco, Calif. [51]Hemphill, Noyes & Co., New York City. [52]Nesbitt, Thomson & Co., Montreal.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
Atlantic Gypsum Products 1st 6s, 1941 ($28,000)[2]	$7400 for the lot	.....
Florida Portland Cement (Del.),[3] 50 shs. com., no par and 50 pfd.	$450 for the lot	.....
American Portland Cement,[3] 100 shs., par $10	$100 for the lot	.....
American Portland Cement,[3] 400 shs., par $10	$400 for the lot	.....
American Portland Cement,[3] 100 shs., par $10	$75 for the lot	.....
Universal Gypsum and Lime, 300 shs.[1]	$4 for the lot	.....
Universal Gypsum and Lime, 200 shs.[1]	$2 for the lot	.....

[1]Price at auction by Adrian H. Muller & Son, New York, August 6, 1930. [2]Price at auction by Adrian H. Muller & Son, New York City, November 19, 1930. [3]Price at auction by Adrian H. Muller & Son, New York City, Dec. 10, 1930.

Indiana Limestone Company May Expand Lime Making Operations

AMERICAN INDUSTRY is eliminating waste; by utilizing practically 100% of all the raw material which enters plants and factories, increased business has been developed through byproducts, according to the Indiana Limestone Co. President A. E. Dickinson of the company has the following to say in the matter:

"In our own industry which provides the stones for outstanding buildings ranging from homes to skyscrapers, a large number of byproducts of commercial value and use have been developed. It is simply a case of using material that was formerly thrown into the discard as of no value. The Indiana limestone industry's enormous natural resources and large volume of production make possible the manufacture of byproducts on a large scale.

"In the production and fabrication of stone for the building industry, considerable waste material is developed. Because of the high calcium value of the oolithic limestone, it is very desirable for many chemical and industrial uses. Spalls and waste pieces up to 150 lb. in weight are used extensively in the steel industry as a fluxing material for use in blast furnaces. Lime produced from Indiana limestone is used for water purification, glue manufacture, production of refractory brick and in the manufacture of strawboard and paper. At present the company is equipped to produce 25,000 tons annually of calcium lump lime. More than 106,000 tons of pulverized limestone was sold last year for the manufacture of glass and for agricultural fertilizer.

"Many other uses are found for Indiana limestone byproducts such as a basis for tooth paste, topping for tennis courts, breakwater stone and railroad embankments.

"Scientific research is aiding modern industry."

Balance Sheet of the Wabash Cement

THE balance sheet of the Wabash Portland Cement Co., Detroit, Mich., as of October 30, 1930, is reported as follows (compared with the balance sheet of the year before):

Assets:	October, 30, 1930	November, 30, 1929
Real estate and plant	$2,700,548	$2,012,306
Cash and securities	660,770	1,068,987
Current and deferred items	401,290	329,108
Total	$3,762,608	$3,410,401

Aundel Corp. Earnings

THE ARUNDEL CORP., Baltimore, Md., sand and gravel produced and dredging contractor, reports net profits, after depreciation, taxes, etc., for the 10 months ending October 31 of $2,290,994 against $1,962,721 for the same period in 1929.

Liberty Limestone Corp. Sells Bond Issue

WALTER W. CRAIGIE & CO., Richmond, Va., bankers, are offering at par $150,000 in first mortgage sinking fund 6½% gold bonds of the Liberty Limestone Corp., Rocky Point, Va. The bonds are dated November 15, 1930, and are due in 10 years. Interest is payable semi-annually in May and November. The bonds are in denominations of $500 and $1000. The American Bank and Trust Co., Richmond, is trustee.

The bonds are callable on any interest date on 60 days' notice at 101½ up to November 15, 1932, at 105 up to November 15, 1938, and at 103 thereafter. Sinking fund payable annually beginning November 15, 1931, of not less than $7500 or an amount based on 5 cents per net cubic yard of stone quarried, whichever is larger, to retire bonds by purchase at not exceeding call price or by call by lot at such price. Bonds so retired to be cancelled. The bonds are secured by a first closed mortgage on all property and by pledge of leases and contracts. They are issued to acquire properties and assets of a predecessor company. State taxes not exceeding 5 mills will be refunded. The corporation pays the normal income tax up to 2%.

The corporation succeeds the Liberty Lime and Stone Co., Inc., and is engaged in the production and sale of commercial crushed and ground limestone for all purposes.

John W. Stull is president and treasurer.

Indiana Limestone Co. Earnings Exceed Those of 1929

NET PROFIT, after taxes and charges, of the Indiana Limestone Co. for the fiscal year ended November 30, 1930, will be slightly in excess of that in the previous fiscal year, according to Lawrence H. Whiting, chairman of the board.

He said that the outlook for 1931 is good and that the company has just closed a contract involving approximately $1,000,000 for the cut stone for the new Mellon Institute in Pittsburgh.

In the year ended November 30, 1929, Indiana Limestone showed consolidated net profit of $10,349, after all charges and taxes, or the equivalent of 20 cents a share earned on 50,000 shares of preferred stock, against $430,145, or 5 cents a common share on 1,500,000 shares in the previous year.

Southwestern Cement Extra

THE Southwestern Portland Cement Co., Los Angeles, Calif., declared an extra dividend of $1 on the common, in addition to the regular quarterly dividend of $1.50 and $2 on the preferred. The extra dividend is payable December 24 and the regular dividends are payable January 1.

Warner Company Omits Extra Dividend But Plans Expansion

THE DIRECTORS of the Warner Co., Philadelphia, Penn., have declared the regular quarterly dividends of 50 cents per share on the common stock and 1¾% on both the first and second preferred stocks. The common dividend is payable January 15 to holders of record December 31, while the preferred dividends are payable January 1 to holders of record December 15.

The 50-cent quarterly rate has been in effect on the common stock since and including July 15, 1929. On October 15, 1929, and January 15, 1930, an extra of 50 cents per share was also paid, while on July 15 and October 15 last extras of 25 cents each were paid.

The company has appropriated approximately $900,000 for new plant construction and expansion. Additional retail terminals for distribution of concrete will be established and facilities of terminals now in operation will be enlarged.

Expansion in this department of the company's business is necessary to meet the steadily increasing demand for delivery of centrally mixed concrete.

Franklin-Fluorspar Co. to Redeem Bonds for Sinking Fund

TENDERS will be received up until noon, Friday, December 19, 1930, at the office of the Union Trust Co. of Pittsburgh, Penn., trustee, under indenture of trust of the Franklin-Fluorspar Co. securing an issue of $1,000,000, 10-year 6% sinking fund gold notes, dated December 1, 1924, for the sale to it for sinking fund purposes of all or any part of as many notes of this issue as the sum of $100,669 then available in the sinking fund will pay at prices not exceeding 105 and interest.

Pennsylvania Glass Sand Bonds Called for Redemption

THE 1st 6s, 1952 of the Pennsylvania Glass Sand Corp., Lewistown, Penn., in the amount of $56,000, have been called for redemption at 105 on January 1, 1931, at Brown Bros. and Co., New York, Boston and Philadelphia.

Recent Dividends Announced

American Aggregates pfd. (qu.)	$1.75	Feb. 2
Ideal Cement com. (qu.)	0.75	Jan. 1
Ideal Cement com. (extra)	0.50	Dec. 22
Pennsylvania Glass Sand Corp. pfd. (qu.)	1.75	Jan. 1
Superior Portland Cement Cl. A (mo.)	0.27½	Jan. 1
Superior Portland Cement Cl. B (qu.)	0.25	Dec. 20

New York Crushed Stone Association in Annual Meeting

THE ANNUAL MEETING of the New York State Crushed Stone Associaton was held at the Pennsylvania Hotel, New York City, on Friday, December 12. It was called to order by President Odenbach promptly at 10 o'clock a. m. as a full day's session was anticipated.

After the reading by Secretary Owens, of the minutes of the previous meeting, and their subsequent approval by vote, Mr. Owens reported on the hearing before the Lien Law Committee of the State Legislature the previous Friday, December 5. He then read letters from Secretary Hayes of the New York State Contractors' Association requesting support of the stone producers in their effort to obtain legislation for the pre-qualification of bidders, and for the cashing of certified checks by the State Highway Department, when they accompanied bidding proposals. Because of the lack of time necessary for the proper study of these proposed statute changes, it was felt that nothing could be accomplished at this meeting, and Secretary Owens was requested to so advise the contractors' association.

The subject of the wording of the resolution to the Governor and Legislative leaders for early appropriations in 1931 was then discussed, culminating in a motion by John Rice that the committee make the necessary revisions. This resolution was in effect that funds for construction work in 1931 be made available as quickly after January 1 as possible, and not delayed, as has been the case in past years, until almost the end of the session of the legislature.

Brief Submitted to Legislature on Material Bonding Law

The bonding law on materials was taken up, and Mr. Rice explained the workings of the present Pennsylvania law as compared to conditions in New York. Numerous thoughts were then presented by the members, and it was decided to crystallize these into a brief to be submitted to the joint state legislative committee at its hearing in the afternoon. By resolution, Messrs. Rice, Owens, Odenbach and Schaefer were made a committee to prepare the brief.

Upon Mr. Moore's statement to the meeting that a wreath had been sent to John Heimlich's funeral the previous day, in behalf of the New York Crushed Stone Association, Mr. Rice offered a resolution seconded by Mr. Seitz and unanimously carried, that the secretary be instructed to prepare a suitable message of condolence to be transmitted to Mr. Heimlich's family. Mr. Heimlich was associated with his two sons, J. Leonard and Walter, in the LeRoy Lime and Crushed Stone Corp., at LeRoy.

The meeting then recessed until after the legislative committee hearing at the Bar Association Chambers. At this meeting, which all of the members attended, John Rice submitted the brief of the New York stone producers favoring the enactment of a bonding law on materials and labor. He spoke briefly before the committee and also submitted telegrams from the Buffalo Slag Co. and from F. W. Schmidt as a stone producer in New Jersey as well as New York, both in favor of a bonding law on materials. Attorney Fackenthal, representing the New York Trap Rock Corp., spoke in favor of such a bill, as did President Odenbach and a number of others including Henry Marsh of Rochester, who represented the New York State Sand and Gravel Association. Mr. Marsh submitted a resolution of his organization favoring a bonding law.

Later in the afternoon the meeting reconvened at the Pennsylvania hotel, and took up the matter of special train from New York state to the National Crushed Stone Association convention at St. Louis next month. A. G. Seitz, chairman of the transportation committee, reported on train schedules, and it was decided to leave Saturday afternoon, January 17, to arrive in St. Louis at about 1:30 p. m. Sunday afternoon, January 18. The special will originate at Albany, and will pick up members from that point to Buffalo.

After another discussion regarding a single state organization for sand, gravel and stone, Mr. Rice sponsored a resolution that President Odenbach appoint a committee to act for the stone producers pending further developments. Messrs. Odenbach, A. S. Owens and Schaefer were named on this committee.

It was then decided to hold the January meeting during the convention at St. Louis at a time and place to be designated by the chair, after communication with National Secretary Boyd.

The nominating committee, headed by Mr. Seitz, was then called upon, and the following officers were then nominated and unanimously elected to serve during 1931: President, A. S. Owens, Eastern Rock Products Inc., Utica; vice-president, H. V. Russell, Jointa Lime Co., Glens Falls; secretary and treasurer, Geo. E. Schaefer, General Crushed Stone Co., Rochester.

Those present were:

John Rice, Sr., and John Rice, Jr., the General Crushed Stone Co., Easton, Penn.
F. W. Schmidt, North Jersey Stone Co., Morristown, N. J.
A. S. Owens, Eastern Rock Products, Inc., Utica.
John H. Odenbach, Dolomite Products Co., Rochester.
A. G. Seitz and F. C. Owens, General Crushed Stone Co., Syracuse.
D. L. Moore, LeRoy Lime and Crushed Stone Co., LeRoy.
B. R. Babcock, Callanan Road Improvement Co., Albany.
A. L. Hooker, Buffalo Crushed Stone Co., Buffalo.
W. L. Foote, Wickwire Spencer Steel Corp., Gasport.
H. V. Russell, Jointa Lime Co., Glens Falls.
George E. Schaefer, General Crushed Stone Co., Rochester.
E. M. Buck and V. A. Leslie, *Pit and Quarry*, New York.
R. W. Connant, Bucyrus-Erie Co., New York.
Also Reed Callanan of Callanan Co., Albany, and Attorney Fackenthal of New York Trap Rock Corp., both of whom, however, were not at the meeting at the Pennsylvania Hotel.

Weston-Brooker Company Open New Georgia Stone Plant

THE $500,000 granite quarry and crushing plant of the Weston-Brooker Co. near Cedar Rock, Ga., was opened officially December 10.

The Kiwanis club of Warrenton served a barbecue to 500 guests, and well-known citizens from Virginia, North Carolina, South Carolina, Florida and Alabama were present, in addition to Georgians.

With a capacity of 60 carloads of crushed granite per day, the Cedar Rock plant is of modern design. Large belts will carry rock from quarry to crushers and from storage bins to loading cars. Cedar Rock, itself, which covers about 135 acres, is owned outright by the Weston-Brooker Co. It stands about 45 ft. above the ground, and its quarrying will continue profitable for more than a century if the plant runs at full capacity.

The quarry is located on the Georgia railway and the Savannah and Atlanta railway, with lines to Atlanta, Augusta, Macon and Savannah.

Two plants, at Columbia, S. C., and Edgefield, S. C., are already being operated by the company.—*Macon* (Ga.) *Telegraph.*

Ready-Mixed Concrete Plant for Spokane, Wash.

ANTICIPATING larger volume of construction and increased use of concrete, the Central Premix Concrete Co., Spokane, Wash., has been incorporated. Within 60 days the new company expects to have a central concrete mixing plant in operation on Division street just north of the river.

Incorporators are William Murphy and M. J. Burke, general contractors in Spokane for a number of years, and D. B. Heil, attorney. Capital is $15,000, incorporation.

"The business of central concrete mixing has grown in many places during the several years because it has been proven economical and satisfactory, especially where a limited amount of concrete is needed," Mr. Heil said. "Necessity of having materials hauled and stored on the job, hauling a mixer to the job, and mixing in small lots is eliminated. Delivery is made from the plant in special trucks which keep the mixture agitated. It has been demonstrated that a more scientific mix results from the handling of concrete in a central plant. We expect the new plant will be in operation within 60 days in time to serve construction jobs this winter and spring."—*Spokane* (Wash.) *Chronicle.*

Hawkeye Cement Company Plans Quarry Developments

EMPLOYMENT for 115 men, the present working force at the Hawkeye Portland Cement Co., Earlham, Ia., quarry, is assured for the remainder of the winter months by an announcement made public a few days ago. For in the weeks between now and spring the Hawkeye company plans to make $32,000 worth of improvements to its Earlham plant. Two projects of $18,000 and $14,000 respectively, for a new office building and 72-ft. track scale will be begun immediately. There are several minor construction jobs that will be undertaken this winter, and of course machinery will be subjected to its annual winter going-over. The force of 115 men, while considerably smaller than that of late summer when 239 men were employed, is the largest ever worked at this season of the year. Officials of the company do not think, however, that additional men will be taken on until spring work opens up. Their object is to provide employment for the splendid force of workmen they now have and keep the group intact until crushing, stripping and rock loading can be resumed in earnest.

The projected office building will occupy the site of the present office and machine shop. Excavation for the foundation was begun recently. It will be 34 ft. wide and 103 ft. in length. The office proper will be 34x36 ft., including the regular office, foreman's office and first aid station. Above this section of the building will be a second-story room of the same size to be used for storage.

The machine shop adjoining at the rear will be considerably larger and warmer than the one now in use, and will be on a level with the trackage nearby. Construction will be of cement plaster on metal lath with a steel framework. This building is conservatively estimated to cost $18,000.

A new 72-ft. track scale will be built near the crusher at a cost of $14,000. The expense of this improvement, it is said, will be borne jointly by the Rock Island and the Hawkeye company, each paying half.—*Earlham* (Ia.) *Echo.*

Federal Trade Commission Still Working on Cement Price Structure

REGARDING its investigation of price bases, the Federal Trade Commission announces: "The force engaged on this inquiry is occupied in gathering facts as a basis on which to present constructive measures which might be employed to promote greater efficiency, economy and fairness in the basing of prices. At the present time efforts are being concentrated on the study of cement. Because of the size and complexity of this study, it will be some time before actual writing of the report can be completed."

Alpha Cement Cultivates Them While Young!

THE FOLLOWING INTERESTING account of the trip of Boy Scout troop 4 to the limestone mine of the Alpha Portland Cement Co., Ironton, Ohio, was written by Eagle Scout Jack Karreman of that troop. [Only a few extracts reprinted.—Editor.]

"We met Mr. Jim Beddall, chemist of the cement plant at the company garage. He introduced us to the mining superintendent, who promised to run us down the shaft in the elevator to the mine.

"First, we saw the machine that runs the elevator, and the automatic shut off that operates in case the operator falls dead or leaves the machine.

"Then we visited a room that had static electricity machines that set up an explosion in a stack to condense the cement dust out of the air. This saves them 300 cars of cement a year. It also keeps the surrounding country free from cement dust.

"The mine shaft is lined all the way with concrete, some places 6 ft. thick. . . .

"Approximately fifty men and five mules work in the mine daily. The mine is free of rats but has a few mice that come in with the feed. . . .

"Soon we came to the room where they stored dynamite. We were told not to touch them because if we should touch our hands to our face after handling the dynamite, we might get a headache. Kitty remarked that we perhaps wouldn't have any head left for a headache.

"Jim asked us if we knew our way out, and we all answered 'no.' He then asked the direction we were going, and we said north, but we were wrong. We were going toward the river. He then asked what we would do if he suddenly turned out the light and disappeared. We said, 'follow the track,' and this answer was right."

New Consultant for Cement and Allied Industries

FREDERICK O. ANDEREGG, Ph.D., formerly associate professor of physical chemistry at Purdue University, more recently senior industrial fellow at the Mellon Institute of Industrial Research, in charge of investigations of portland cement and masonry, announces the opening of a consulting practice on building materials, including portland cement, cement products and masonry. His office is 206 Fulton building, Pittsburgh, Penn.

To Erect Skyscraper

AN 87-FOOT frontage on Sixth street, immediately adjoining the northwest corner of Sixth street and Grand avenue, Los Angeles, Calif., sold for the record price of $500,000. The purchaser was the Southwestern Portland Cement Co., which intends to erect a limit-height building.

Two Lehigh Cement Plants Said to Be Starting Up

AFTER A SHUT-DOWN for repairs extending over several weeks, the Lehigh Portland Cement Co. mill at Mitchell, Ind., resumed operations December 1, according to an official statement. It is the expectation that the mill will now run throughout the winter. Weather conditions influencing outside construction work, business conditions, etc., will determine spring operations, it is said. — *Mitchell,* (Ind.) *Tribune.*

The Lehigh Portland Cement Co. started operating again at Metaline Falls, Wash., December 1 on a 50% capacity basis, following a shut-down of several months during which new equipment, being used for the first time in the cement industry, was installed.

In announcing the reopening of the plant, W. G. Perrow, district manager, said the 50 men to be put to work are old employes.

"The new equipment cost $50,000 and consists of air classifying equipment which will increase the quality of the cement and also the output of the plant," Mr. Perrow said. "B. L. Pake, assistant chemical engineer of the company at Allentown, Penn., is at the plant, having watched the installation of the new equipment and remaining there to observe its operation for a time."

Burning will be started in one of the two kilns of the plant and will continue throughout the winter and as long thereafter as business conditions warrant, Mr. Perrow said.—*Spokane* (Wash.) *Chronicle.*

Claude A. Simpler

CLAUDE ALEX SIMPLER, vice-president of the Giant Portland Cement Co., died November 27 at his home in Philadelphia, Penn. He was born in Williamsport, Penn., November 27, 1869, and came to Philadelphia at an early age. He was educated in the public schools and at Girard College, graduating from the latter institution in 1885.

He entered the services of Real Estate Land Title and Trust Co. in 1889 and a short time later was appointed trust officer, in which capacity he served until November 1, 1927, when he was elected vice-president of the company. When he retired from this position in April he had been in the service of the bank for 41 years.

Mr. Simpler also was vice-president and a director of Jacob Reed's Sons, director of the Erben-Harding Co., director of the Central Penn National Bank and director of the Sylvania Insurance Co.

He was a member of the Union League and several other clubs. Surviving him are his widow, Lucia A. Von Badenfeld Simpler, formerly of Boston, whom he married on October 10, 1894, and two sons, Albert A. Simpler and Wayne K. Simpler, both of Philadelphia. A third son, Roland, died in 1925.—*Philadelphia* (Penn.) *Public Ledger.*

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

	Limestone Flux Week ended		Sand, Stone and Gravel Week ended	
District	Nov. 15	Nov. 22	Nov. 15	Nov. 22
Eastern	1,664	1,775	6,100	4,629
Allegheny	1,870	1,665	4,698	3,995
Pocahontas	231	207	1,018	1,190
Southern	350	463	7,210	7,375
Northwestern	1,445	963	4,245	3,253
Central Western	456	475	7,338	6,450
Southwestern	427	354	4,977	4,814
Total	6,443	5,902	35,586	31,706

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1929 AND 1930

	Limestone Flux Period to date		Sand, Stone and Gravel Period to date	
	1929	1930	1929	1930
District	Nov. 23	Nov. 22	Nov. 23	Nov. 22
Eastern	156,225	131,335	537,692	383,676
Allegheny	167,517	124,193	349,236	293,821
Pocahontas	17,818	20,887	47,553	59,367
Southern	28,494	28,931	412,994	383,365
Northwestern	52,437	46,808	297,754	254,475
Central Western	24,735	22,678	499,710	452,285
Southwestern	23,645	20,914	325,518	298,977
Total	470,871	395,746	2,470,457	2,125,966

COMPARATIVE TOTAL LOADINGS, 1929 AND 1930

	1929	1930
Limestone flux	*470,871*	*395,746*
Sand, stone, gravel	*2,470,457*	*2,125,966*

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week of December 13:

SOUTHERN FREIGHT ASSOCIATION DOCKET

53041. **Fuller's earth,** from Midway and Quincy, Fla., to Omaha and South Omaha, Neb. Present rate, to Omaha, $12.37; South Omaha, $12.36 per net ton. Proposed rate on fuller's earth in bags or sacks, or in bulk in box cars (see Item 9 of S. A. L. Ry., I. C. C. A7415), carloads, minimum weight 50,000 lb.; in barrels or casks, carloads, minimum weight 40,000 lb., from Midway and Quincy, Fla., to Omaha and South Omaha, Neb., $11.13 per net ton. Proposed in order to properly align the rates from and to the points in question with rates from other producing points in the same general territory.

53044. **Lime,** from Knoxville, River Front Extension and South Knoxville Extension, Tenn., to Plasterco and Saltville, Va. Present rates: (a) 320c, (b) 256c per net ton. Proposed rate on (a) lime, common, hydrated, quick or slaked, in bulk or in packages, as provided for carload shipments in Southern Classification, carloads, minimum weight 30,000 lb., 280c per net ton. (b) Lime, common, hydrated, quick or slaked, in bulk or in packages, as provided for carload shipments in Southern Classification, in straight or mixed carloads, minimum weight 50,000 lb., 224c per net ton. The proposed rates are based on the I. & S. 2874 scale.

53062. **Calcite, ground or pulverized,** from Cartersville, Ga., and Sparta, Tenn., to Lowell, Mich. Present rate, from Cartersville, Ga., 640c; Sparta, Tenn., 633c per net ton. Proposed rate on calcite, ground or pulverized (ground or pulverized limestone or marble), carloads (See Note 1), except when car is loaded to full visible capacity, actual weight will apply. Not subject to Rule 34 of Southern Classification, from Cartersville, Ga., 515c and from Sparta, Tenn., 499c per net ton. Same as at present applicable from the same origins to Grand Rapids, Mich.

53079. **Lime,** from Watauga, Tenn., to points in southern territory. It is proposed to establish specific rates on lime, carloads, minimum weights 30,000 and 50,000 lb., from Watauga, Tenn., to points of destination in Agent Glenn's I. C. C. A684, the same as presently in effect to Elkanah, Tenn.

53080. **Fluorspar,** from East St. Louis, Ill., to Alcoa, Tenn., and Badin, N. C. Present rates, 8th class. Proposed rates on fluorspar, carloads, from East St. Louis, Ill., to Alcoa, Tenn., 33c, and Badin, N. C., 41½c per 100 lb.

53083. **Bulk pile, run acid phosphate,** from Nashville and West Nashville, Tenn., to points in Arkansas. It is proposed to establish the following rates on bulk pile, run acid phosphate, carloads, minimum weight 80,000 lb., or marked capacity of car used when less than 80,000 lb., from Nashville and West Nashville, Tenn., to Texarkana, Ark., 25½c; Batesville, Ark., 21c; Fordyce, Ark., 23c; Star City, Ark., 23c, and Searcy, Ark., 21c per 100 lb. Made in line with rate to Hope, Ark.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

53084. **Furnace or kiln lining or high temperature bonding mortar or cement,** from Augusta, Ga., to points in southwestern territory. It is proposed to establish rates on furnace or kiln lining or high temperature bonding mortar or cement, in bags or barrels, in straight carloads or in mixed carloads with fire brick or clay, carload minimum weight 50,000 lb., from Augusta, Ga., to points of destination shown in Agent Johanson's F. T. 151, 154A and 152, supplements thereto or reissues thereof, the same as in effect on brick, by adding this commodity to the present description covering brick as published in those tariffs.

53090. Stopover privileges for partial unloading at points in southwestern territory on **lime** originating at producing points on the N. C. & St. L. Ry. and destined to points in Arkansas, Louisiana (west of Mississippi river), Oklahoma and Texas. It is proposed to authorize partial unloading at points west of Mississippi river, at a charge of $6.30 per ton, on lime, carloads, from N. C. & St. L. Ry. producing points, viz.: Chattanooga, Burns, Jasper, Sherwood, Summitville, Tenn., and Cumberland, Ala., destined points in Arkansas, Louisiana (west of Mississippi river), Oklahoma and Texas.

53093. **Chert, gravel, sand, slag and stone, from** Kerns, Va., Shuleen, Va., and Marion, Va., to (a) stations on A. C. L. R. R., S. A. L. Ry., and short line connections in Virginia, North Carolina and South Carolina; (b) stations on Southern Ry. in North Carolina and South Carolina. It is proposed to establish rates on chert, gravel, sand, slag and stone from and to the above named points on basis of I. C. C. Docket 17517.

53099. **Fuller's earth,** from points in Alabama to Omaha and South Omaha, Neb. Present rates, to Omaha, $12.37; South Omaha, $12.36 per net ton. Proposed rates on fuller's earth, in bags or sacks, carloads, minimum weight 50,000 lb., in barrels or casks, carloads, minimum weight 40,000 lb., from Algreen, Clayton, Eufaula, Louisville and White Oak, Ala., to Omaha, Neb., and South Omaha, Neb., $11.13 per net ton, same as proposed under Submittal 53041 from Midway and Quincy, Fla.

53134. **Soapstone, talc,** crude or ground, points in North Carolina to points in C. F. A., I. F. A. and W. T. L. C. territories. It is proposed to establish rates on soapstone, talc, crude or ground, straight or mixed carloads, minimum weight 50,000 lb., from Candor, Ellerbe, Glendon, Hemp and Putnam, N. C., to points in C. F. A., I. F. A. and W. T. L. C. territories, 45c per net ton higher than the rates suggested from Murphy, N. C., under Submittal 52244. Statement of the present and proposed rates will be furnished upon request.

53143. **Cement,** from Louisville and Kosmosdale, Ky., to stations on the Interstate Public Service Ry. and the Union Traction Co. of Indiana. It is proposed to establish rates on cement, carloads, from Louisville and Kosmosdale, Ky., to stations on the Interstate Public Service Ry. and the Union Traction Co. of Indiana. Statement of the present and proposed rates will be furnished upon request.

53152. **Crushed stone and slag,** from Rocky Point, Indian Rock, Eagle Mountain and Longdale, Va., to Southern Ry. stations in Virginia. It is proposed to publish rates on crushed stone, from Rocky Point, Indian Rock and Eagle Mountain, Va., and on slag from Longdale, Va., in straight or mixed carloads (See Note 3), to Southern Ry. stations in Virginia, Montview, Va., to Danville, Va., inclusive; also Southern Ry. stations Danville, Va., to Granite, Va., and Danville to Kingmon, Va., inclusive, including stations on the Keysville Branch, on basis of the Trunk Line Scale prescribed by the commission in Docket 17517, in lieu of the present combination rates. Statement of present and proposed rates will be furnished on request.

TEXAS-LOUISIANA TARIFF BUREAU DOCKET

S-2962-LA. **Crushed marble or marble chips,** carloads, from New Orleans, shipside, import to Shreveport, La. Proposition from shippers to establish rate of $2.28 per ton of 2000 lb. on crushed marble or marble chips (See Note 3), from New Orleans, La., shipside, on import traffic, to Shreveport, La.

There is a contemplated movement of this commodity and no specific rates are in effect and present class rate is prohibitive.

Proposal 338-TX (S-7943-TX)—**Cement,** carloads, from Longhorn and Cementville, Tex., to Dittlinger, Tex.: Proposition from shippers to establish rate of 5c per 100 lb. on cement, carloads, minimum weight 95,000 lb., from Longhorn and Cementville to Dittlinger, Tex. Rate, if established, will enable carriers to meet truck competition.

SOUTHWESTERN FREIGHT ASSOCIATION DOCKET

21456. **Lime,** between points in Missouri. To provide that present less than carload lots commodity rates on lime will also apply on lime, in four-ply multiple-wall paper bags, weighing not to exceed 50 lb. per bag, in less than carload quantities, between all points provided with less than carload rates on lime on Missouri intrastate traffic in the following tariffs:

Agent Boyd's 91-F, P. S. C.-Mo. No. 354.
Mo. Pac. 6708-C, P. S. C.-Mo. No. 1657.
Mo. Pac. 6172-F, P. S. C.-Mo. No. 1812.
St. L.-S. F. 3405-C, P. S. C.-Mo. No. 1023.
St. L.-S. F. 69-L, P. S. C.-Mo. No. 1033.

The proponent shipper, whose plant is located at Springfield, states that the savings effected in using this four-ply paper bag will result in increased movement. Attention is called to present application of the proposed rule on Kansas, Nebraska, Minnesota, South Dakota, and Wisconsin intrastate traffic. It is felt that the Missouri shippers should be accorded the same privilege, and it appears that since the proposed container is reasonably safe and adequate from a transportation standpoint, the carriers will not suffer a loss in revenue, but will benefit by the resulting increase in tonnage.

21457. **Gypsum rock,** from Winfield, La., to Marquette and Cape Girardeau, Mo. To establish a rate of 19 cents per 100 lb. on gypsum rock, carloads, (See Note 2), from Winfield, La., to Marquette and Cape Girardeau, Mo. It is stated that a large deposit of gypsum rock has recently been discovered in the vicinity of Winfield, La., and a crushing plant at that point expects to begin shipping the rock to cement plants in the near future provided rates are established on which this low grade traffic can move.

21458. **Talc,** from Memphis, Tenn., to Tulsa, Okla. To establish a proportional rate of $5.50 per ton of 2000 lb. on talc, ground or crude, in boxes, bags or bulk, carloads, minimum weight 36,000 lb., from Memphis, Tenn., when originating at points in the state of Georgia, to Tulsa, Okla.

The present rate on talc from Cartersville, Ga., the principal point of origin in Southern territory, to Tulsa, Okla., is $13.50 per ton of 2000 lb. Shippers state that this commodity is used in the manufacture of paint, as a filler, and has practically the same value as silica, or approximately $15 per ton. Competition is encountered with shippers of silica from nearby points, from which the rates are considerably less than on talc, from Cartersville, Ga., and shippers state that the proposed rate is necessary to move the traffic.

21615. **Glass sand,** from Browntown, Wis., to

points in Oklahoma. To establish rates on glass sand, carloads (See Note 2), from Browntown, Wis., to points in Oklahoma, based 1½c per 100 lb. over the rate currently applicable from Ottawa, Wis. Shippers contend that in view of the fact Browntown, Wis., is usually accorded same basis of rates as the Ottawa district on traffic destined to Oklahoma territory, they should have same basis of rates on glass sand.

21691. **Lime,** from Osceola, Mo., to Texas points. To establish the following rates in cents per 100 lb. on lime (calcium), viz.: Common lime, hydrated, quick or slaked, in straight or mixed carloads, minimum weight 30,000 lb., from Osceola, Mo., to Texas points shown below:

	Rate		Rate
Texline	41½	Estelline	34
Dalhart	34	Turkey	37
Amarillo	34	Quitaque	37
Memphis	34	Vernon	28
Clarendon	34	Quanah	28

Shippers are requesting the same rate from Osceola, Mo., to Texas points as is now applicable from Ash Grove and Springfield, Mo. Osceola and Ash Grove are on the same basis when to points in Oklahoma.

21703. **Limestone,** from Mosher and Ste. Genevieve, Mo., to points in Illinois. To establish the following rates in cents per 100 lb. on limestone, broken, crushed or ground, carloads (See Note.) Note—The commodity description to destinations on the I. C. R. R., B. & O. R. R., C. B. & Q. R. R. and M. & O. R. R. to read "agricultural limestone," minimum weight 10% less than marked capacity of car but not less than 40,000 lb., from and to points shown below. From Mosher and Ste. Genevieve, Mo.:

To (Illinois points)			
B. & O. R. R.			
Caseyville	135	Breese	135
Lebanon	135	Beckemeyer	135
Trenton	135	Sandoval	126
C. & E. I. Ry.			
Benton	126	Johnston City	126
West Frankfort	126	Marion	126
C. B. & Q. R. R.			
Waltonville	126	Royalton	126
Rend City	126	West Frankfort	126
Sesser	126	Orient	135
Christopher	126	Freeman	135
Zeigler Junction	126	Christopher Mine No. 20	135
Zeigler	126		
Ill. Cent. R. R.			
Belleville	112	Thompsonville	135
Wilderman	112	Galatia	139
Freeburg	112	Eldorado	139
Lementon	112	Zeigler	126
New Athens	112	Carterville	126
Lenzburg	112	Marion	126
Marissa	112	Clifford	126
Tilden	112	Cambria	126
Swanwick	112	Dew Maine	126
Winkle	112	Herrin	126
Pinckneyville	112	Johnston City	126
Vergennes	112	Bois	112
Murphysboro	112	Tamaroa	112
Denny	112	Sunfield	112
Christopher	112	Dowell	112
Buckner	112	Hallidayboro	112
Benton	112	De Soto	112
West Frankfort	126	Sandoval	126
Logan	135	Royalton	126
J. S. W. R. R.			
Nason	138		
L. & N. R. R.			
Nashville		Belleville	126
Mascoutah	126	Eldorado	144
Rentchler	126		
M. & E. R. R. (See Mo. Pac. R. R.)			
Mo.-Ill. R. R.			
Salem	90	Evansville	90
Centralia	90	Flinton	80
Nashville	90	Kellogg	80
Coulterville	90	Chester	80
Sparta	90		
Mo. Pac. R. R.			
Murphysboro	112	Clifford	112
De Soto	112	Herrin	112
Bush	112	Carterville	112
Royalton	112	Marion	112
Zeigler	112	Johnston City	112
Benton	112		
M. & O. R. R.			
Murphysboro	112	Moffat Mine	90
Campbell Hill	112	Eden Mine (Millstadt Branch)	90
Willisville	112	Millstadt	125
Percy	112		
Sou. Ry.			
Germantown	126	Shiloh	126
New Baden	126	Belleville	126
W. C. & W. R. R.			
Waltonville	126	Conants	112
Tamaroa	126	Cutler	112
Pincneyville	112	Percy	112

The Interstate Commerce Commission in I. C. C. Docket 21939 ordered certain rates be published on agricultural limestone from Bonne Terre, Mo., and group to points in southern Illinois. The rates from Mosher and Ste. Genevieve, Mo., are higher than the rates in effect from Flat River, Bonne Terre, etc. The proposed rates are necessary in order to clarify fourth section violations.

21692. **Cement,** from Paducah, Ky., to points in Arkansas and Missouri. To establish the I. C. C. Docket 8182 scale 3 rates on cement, hydraulic, natural or portland, straight or mixed carloads, minimum weight 50,000 lb., except when marked capacity of car is less, actual weight but not less than 40,000 lb. will apply, from Paducah, Ky., to points in Arkansas and Missouri (south of Missouri river.) Shippers ask that the above rates be established in view of the fact that rates are published at the present time to points in Arkansas from Marquette, Mo., Kosmosdale, Ky., and Alabama producing points in S. W. L. Tariff 168A, on the same basis as herein proposed and publication has been authorized on such basis from these producing points to stations in Missouri south of the Missouri river and eastern Kansas.

21710. **Sand and stone,** from Cape Girardeau, Mo., to Sikeston, Mo. To establish a rate of 70c per ton of 2000 lb. on sand (except asbestos sand and silica sand), stone, crushed (broken stone ranging in size up to 200 lb. weight), including ground limestone, in bulk or in bags, but not including gypsum rock (See Note 3), except the minimum weight shall not be less than 40,000 lb., from Cape Girardeau, Mo., to Sikeston, Mo. The proposed rate is currently applicable via St. L.-S. F. direct and it is desired to meet the rate via other routes.

21728. **Stone,** from Fort Scott, Kan., to points in Missouri and Kansas. To apply the single line distance scale, as shown below, on stone, crushed, asphalt coated, carloads (See Note 1), but not less than 50,000 lb., from Fort Scott, Kan., to M.-K.-T. R. R. stations in Missouri and Kansas. Rates in cents per 100 lb.:

Distance	Rate
20 miles and under	5
40 miles and over 20	5
60 miles and over 40	5½
75 miles and over 60	6½
80 miles and over 75	6½
100 miles and over 80	7
110 miles and over 100	7
130 miles and over 110	8
150 miles and over 130	8½
160 miles and over 150	8½
170 miles and over 160	8½
200 miles and over 170	9½
220 miles and over 200	9½
225 miles and over 220	10
250 miles and over 225	10
260 miles and over 250	10½
275 miles and over 260	11½
300 miles and over 275	11½
320 miles and over 300	12
325 miles and over 320	12
340 miles and over 325	12
350 miles and over 340	13
400 miles and over 350	13
450 miles and over 400	13½
500 miles and over 450	14½
550 miles and over 500	16½
600 miles and over 550	18

The proposed scale is applicable from Galena, Kan., Joplin, Mo., etc., at the present time under Item 90A, of M.-K.-T. Tariff 3015J, and as the production of asphalt-coated crushed stone has just begun at Ft. Scott, Kan., it is felt that producers at this point should be given the same scale of rates as enjoyed by competitors in the Joplin district.

21743. **Silica sand,** from Guion, Ark., to Sweetwater, Tex. To establish a rate of $3.40 per ton of 2000 lb. on silica sand, carloads (See Note 2), from Guion, Ark., to Sweetwater, Tex. S. W. L. Tariff 162B, Supplement 4, Item 1B, provides that the rates therein are applicable for the transportation of sand, except asbestos sand and silica sand. It is stated that, apparently through a misunderstanding, rates on silica sand were made an exception to and removed from the application of the rates ordinarily and customarily applicable to common sand. It is further stated that all sand, except asbestos sand, is silica sand.

CENTRAL FREIGHT ASSOCIATION DOCKET

26892. To establish on **spent or refuse grinding sand,** in box cars, carloads (See Note 3), from Butler, Penn., to Versailles, Penn., rate of $1.05 per ton of 2000 lb. Present: 13½c (sixth class).

26893. To establish on **sand and gravel,** carloads (See Note 3), from Lafayette Ind., to Springville, Ind., rate of $1.05 per net ton. Present: 113c per net ton.

26894. To establish on **sand and gravel,** carloads (See Note 3), from Gosport, Ind., to Springville, Ind., rate of 75c per net ton. Present: 80c per net ton per C. I. & L. Tariff 801-C.

26898. To establish on **crushed stone,** carloads (See Note 3), from Greencastle, Ind., to Springville, Ind., rate of 90c per net ton. Present: 99c per net ton.

26899. To establish on **lime, agricultural,** carloads (See Note 3), from Marblehead, O., to McCurdy's, O., rate of 11c. Present, 13½c, intermediate to East Liverpool.

26911. To establish on **limestone, ground or pulverized,** and **limestone dust,** carloads, minimum weight 50,000 lb., from Greencastle, Ind., to Dayton, O., rate of $2 per net ton. Present: 18c (sixth class).

26912. To establish on **beach or lake sand,** carloads (See Note 3), from Grand Haven and Muskegon, Mich., to Grand Rapids, Mich., rate of 70c per net ton. Present: 88c per net ton.

26920. To establish on **crushed stone,** carloads (See Note 3), from Keeport, Ind., rates in cents per net ton, to points in Indiana:

	Prop.	Pres.		Prop.	Pres.
Rivare	100	6th Cl.	DeLong	110	6th Cl.
Decatur	100	122	Monterey	110	6th Cl.
Preble	95	*122	Ora	110	6th Cl.
Magley	95	*122	Bass Lake	110	6th Cl.
Tocsin	95	*122	Aldine	110	6th Cl.
Kingsland	95	*122	No. Judson	115	6th Cl.
Uniondale	90	*122	Wilders	115	6th Cl.
Markle	90	*122	Clanricarde	115	6th Cl.
Bippus	90	6th Cl.	Kouts	120	6th Cl.
Servia	90	6th Cl.	Boone Grove	120	6th Cl.
Bolivar	95	6th Cl.	Hurlburt	120	6th Cl.
Laketon	95	6th Cl.	Palmer	120	6th Cl.
Disko	95	6th Cl.	Winfield	125	6th Cl.
Akron	100	6th Cl.	Crown Point	125	6th Cl.
Athens	100	6th Cl.	Griffith	125	6th Cl.
Rochester	105	6th Cl.	Highlands	125	6th Cl.
Pershing	110	6th Cl.	Saxony	130	6th Cl.
Leiters	110	6th Cl.	Hammond	130	6th Cl.

*Decatur, Ind., rate held as maximum.

26921. To establish on **crushed stone,** carloads (See Note 3), from Madison Mills, Cooks, Mt. Sterling and Era, O., to Greenfield, O., rate of 80c. Route: Via Washington C. H., O., and B. & O. R. R. Present: 90c.

26918. To establish on **dolomite,** burnt or roasted, carloads (See Note 3), from Narlo, O., to Detroit, Mich., rate of $1.70 per net ton. Present —$1.80 per net ton.

26925. To establish on **crushed stone,** carloads (See Note 3), from North Baltimore, O., to Jewell and Okolona, O., rate of 70c per net ton. Route—Via B. & O. R. R., Defiance, O., thence Wabash Ry. Present—85c to Okolona and 80c per net ton to Jewell, O.

26928. To establish on **reinforced concrete pipe and drain tile,** carloads, minimum weight 30,000 lb., between points in C. F. A. territory as described in C. F. A. L. Tariff 130T, rates on basis of 65% of sixth class. Present—Classification basis.

26930. To establish on **crushed stone and crushed stone screenings,** carloads (See Note 3), from Apex, O.

To points in Ohio	Prop. (N. T.)	Pres. (100 lb.)	To points in Ohio	Prop. (N. T.)	Pres. (100 lb.)
B. & O. R. R.					
Uhrichsville	135	13½	Fairpoint	145	14½
Tippecanoe	135	14	Maynard	155	13
Freeport	145	14	Bridgeport	155	12
N. Y. C. R. R.					
Youngstown			(1)	100	15
W. & L. E. R. R.					
Harmon	90	13	Fresno	105	14
Justus	90	13	Coshocton	105	14
Beach City	95	13½	Conesville	115	15
Barr	95	14	Lanes	115	16
Sugar Creek	100	14	Grays	125	16
Chile	100	14	Zanesville	125	16

(1) Proposed same as is now in effect via N. Y. C.-B. & O.

Sup. 1. White Docket Advice 26731, Docket Bulletin 1881, covering proposal to establish rate of $1.13 per ton of 2000 lb. on **spent or refuse grinding sand,** in box cars, carloads (See Note 3), from Butler, Penn., to Versailles, Penn., rate of $1.13 per ton of 2000 lb., is hereby canceled.

26932. To establish on **gypsum blocks or tile; gypsum rock, run of mine; gypsum rock, crushed, not ground; gypsum rock, ground (land plaster), plasterboard; plaster, calcined (stucco, plaster of paris); plaster, wall; lime, common, hydrated, quick or slaked,** included with shipments of plaster, in quantities not to exceed 25% of the minimum carload weight governing such shipments; nails, with carload shipments of plasterboard, in quantities (in each car) not exceeding 1% of total weight of the plasterboard in the car; plaster, in bags (other than paper bags), used as dunnage to protect shipments of gypsum blocks or tile. Applies only when plaster, in bags (other than paper bags), is used as dunnage to protect shipments of gypsum blocks or tile. The weight of the plaster shall not be applied toward making up the required minimum weights on gypsum blocks or tile; from Woodville, O., to destinations in Illinois, Minnesota, Wisconsin, Michigan (Upper Peninsula) and Sault Ste. Marie, Ont., also proportional rates to Atchison, Kan., Council Bluffs, Ia., Kansas City, Kan., Kansas City, Mo., Leavenworth, Kan., Nebraska City, Neb., North Kansas City, Mo., Omaha, Neb., Pacific Junction, Ia., St. Joseph, Mo., Sioux City, Ia., South Omaha, Neb., Duluth, Minn., Superior, Wis., rates on the same basis as published from Gypsum and Port Clinton, O., per C. F. A. L. Tariff 367D. Routing—Specific routing to be furnished by proponent carrier to the

same extent as published from Port Clinton and Gypsum, O., upon authorization of the adjustment. Present—Sixth class.

26934. To establish on **crushed stone,** also **agricultural limestone** (not ground or pulverized), in open top cars only, carloads (See Note 3), from Keeport, Ind., to points in Illinois and St. Louis, Mo., rates as shown in Exhibit A attached. Route—Via Wabash Ry. direct, except to Fairbury, Ill., via Wabash Ry., Forrest, Ill., and T. P. & W. R. R. Present—As shown in Exhibit A attached, except where rates are not shown from Keeport, Ind., classification basis applies.

EXHIBIT "A"

(Rates in cents per ton of 2000 lb.)

To representative points in Ill. & Mo.:	From Keeport, Ind.—Crushed stone Pres.	Prop.	Agricultural limestone Pres.	Prop.
Wabash Railway.				
Danville	76	70	76	70
Urbana	88	80	88	80
Champaign	88	80	88	80
Springfield	113	101	113	101
Jacksonville	....	139	227	115
Quincy	....	139	....	125
Carthage	....	139	....	125
Hamilton	....	139	....	125
Hammond	113	108	113	108
Altamont	....	126	227	126
Lodge	113	106	113	106
Mansfield	113	106	113	106
Forrest	....	118	227	118
Pontiac	....	123	227	123
Streator	....	123	227	123
Reddick	....	126	....	126
Brisbane	....	139	....	139
Steele	....	139	....	139
Litchfield	....	135	227	115
Edwardsville	....	139	....	120
East St. Louis	....	139	....	139
St. Louis*	....	198	....	198
T. P. & W. Railroad.				
Fairbury	....	140	227	140

*Missouri.

TRUNK LINE ASSOCIATION DOCKET

25101, Sup. 1. **Plaster, carloads** (for mixed carloads with lime and plaster board, see footnote), viz.: Dry mortar, fireproofing, plaster; marble dust; plaster blocks, plaster calcined (plaster of paris); plaster, land; plaster, stucco; plaster, wall; whiting; A.

Plaster board, carloads (for mixed carloads with lime and plaster, see footnote), B.

Lime, carloads (for mixed carloads with plaster and plaster board, see footnote), C.

Minimum weight 40,000 lb.

Footnote—Mixed carloads of lime, plaster and articles taking same rates and plaster board, will be charged at actual weight and at the applicable carload rate for each of the respective commodities in straight carloads, subject to minimum weight of 40,000 lb. for each mixed carload, deficit in the minimum weight, if any, to be paid for at the rate on plaster, carloads.

From Victor, N. Y., to Turbotville, Penn., to Berwick, Penn., inclusive, rates A and C, 16c, and B, 17½c per 100 lb.

25246. **Crushed stone,** carloads (See Note 2), from Havre de Grace, Md., to stations Chesapeake Beach Ry.:

	Prop.
District Line, Md., to Marlboro, Md.	140
Pennsylvania Junction, Md., to Owings, Md.	150
Mt. Harmony, Md.	165
Chesapeake Beach, Md.	165

Rates in cents per 2000 lb.

Reason—Rate comparable with others in the same general territory.

25247. **Trap rock, mine rock, broken stone, crushed stone and crushed stone screenings,** carloads (See Note 2), etc., from Jamesville and Rock Cut, N. Y., to all stations on D. & N. Ry., $1.10 per net ton. Reason—Same basis of rates as applicable from other points of origin to the same destination.

25249. **Spent or refuse grinding sand,** in box cars, carloads (See Note 3), from Butler, Penn., to Versailles, Penn., $1.13 per net ton. (Present rate, 13½c per 100 lb.) Reason—Rate comparable with others involving like hauls.

25102, Sup. 1. **Sand,** carloads, (A) in open-top cars, (B) in box cars or closed equipment (See Note 2), from Quail Run, Pinewald and Toms River, N. J., to Temple: (A) $1.80, (B) $1.95; Minersville and Port Carbon, Penn., (A) $2.45, and (B) $2.65; St. Clair, Tamaqua, Shamokin, Excelsior and Natalie, (A) $2.70, and (B) $2.90. Rates in cents per net ton.

25259. (A) **Sand, building,** carloads, (B) **Sand, glass, engine, molding, ground flint, quartz and silex,** in straight or mixed carloads (See Note 2), etc., from Granville, Horningford, Mapleton, McVeytown, Mill Creek, Newton-Hamilton, Ryde, Vineyard, Dawson Mills and Hatfield Works, Penn., to Peterboro, Belleville, Kingston, Port Hope, Ont., (A) $5.35 and (B) $5.60, and Oshawa, Ont., (A) $4.85 and (B) $5.10. Present rate, 36c per 100 lb. Rates in cents per net ton.

25263. **Glass sand,** carloads (See Note 2), from Tatesville, Penn., to Lonaconing, Md., $1.60 per net ton. Present rate, $2.10 per net ton. Reason—Rate compares favorably with others involving like hauls.

25279. **Crushed stone,** carloads (See Note 2), from Blissville Docks, N. J., to Riverhead, N. Y., $1.20, and Hampton Bays, N. Y., $1.25 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

M-1584. To revise rates on **plaster and related articles, sand plasterboard,** carloads, from Chester and Philadelphia, Penn., to stations on the B. & O. R. R., C. & P. A., P. R. R. and W. Md. Ry., Wagoner, W. Va., Brady, Md., Grafton, W. Va., Buchhannon, W. Va., Pickens, Birchwood, W. Va., Cumberland, Md., Niverton, Penn., Berlin, Confluence, Kendall, Alexander, Portage, Sellingsgrove, Penn., Buffalo Shop, N. Y., Spring Gap, Md., Connellsville, Penn., Seymour, W. Va., Harrison, W. Va., Davis, W. Va., and various. Rates ranging from 21c to 32½c per 100 lb.

25287. **Building lime,** carloads, minimum weight 30,000 lb., from Knickerbocker, Howellville, Rambo, Plymouth Meeting, Blue Bell and Devault, Penn., to Princeton, N. J., 10c per 100 lb. Present rate, 11c per 100 lb. Reason—Proposed rate is comparable with rates from and to points in the same general territory.

25289. **Sand,** carloads, (A) in open-top cars, (B) in box cars or closed equipment (See Note 2), from Toms River, N. J., to Swarthmore and Media, Penn., (A) $1.55 and (B) $1.65 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

25291. (A) **Building and chemical lime,** carloads; (B) **agricultural lime,** carloads, minimum weight 30,000 lb., from Frederick and Spahr, Md., to Western Maryland Ry. stations, Deer Lick Mine, W. Va., to Webster Springs, W. Va., inclusive. (A) 21c and (B) 17c per 100 lb. Reason—Proposed rates are comparable with rates from Frederick, Md., to Richwood and Pickens, W. Va.

25292. **Crushed stone,** carloads (See Note 2), from York, Penn., to Kennedyville, Md., $1.40, and Chestertown, Md., $1.50 per net ton. Reason—Proposed rates are comparable with rates from Union Stone Co., Penn.

25294. **Fire stone,** carloads, minimum weight 36,000 lb., from Glenside, Penn., to Trenton, N. S., 50c per 100 lb. Present rate, 56½c per 100 lb. Reason—Proposed rate is same as published from Glenside, Penn., to North Sydney, N. S.

25336. **Gravel and sand,** N. O. I. B. N., in open cars, except blast, engine, foundry, glass, molding, quartz, silex and silica, carloads (See Note 2), from Chenango Bridge, N. Y. Rates per net ton:

To	Prop. rate
Port Crane, N. Y., Sanitaria Springs, N. Y.	$0.95
Tunnel, N. Y.	1.00
Harpursville, N. Y., Nineveh, N. Y., Afton, N. Y.	1.05
Bainbridge, N. Y., Sidney, N. Y., Unadilla, N. Y., Wells Bridge, N. Y., Otego, N. Y.	1.10

Reason—Proposed rates are same as now published from Whitney Point, N. Y., to stations Port Crane to Sidney, N. Y., incl.

Crushed Stone from Illinois

THE INTERSTATE COMMERCE COMMISSION, by Division 4, in No. 21894, Lehigh Stone Co. vs. B. & O. et al., has found rates on crushed stone, including agricultural limestone, from Lehigh, Ill., to destinations in northern Indiana and southwestern Michigan, not unreasonable but unduly prejudicial to the complainant and unduly preferential of producers of crushed stone at McCook and Bellewood, Ill., and of sand, gravel and crushed stone at Joliet and Plainfield, Ill., and at certain points in Indiana. New rates to remove the undue prejudice have been prescribed and ordered to be made effective not later than February 23, 1931. The points in Indiana found to be unduly preferred in the matter of rates on sand, gravel and crushed stone are Lake Ciecott, Kenneth, Monon, Burr Oak, Hibbard, Rochester, Peru, Milford, Milford Junction, Leeland, Whartons, Rupel, Ginger Hill, Huntington, Wolcottville, Lafayette, Elkhart, and Winona Lake.

The commission has divided the destination territory into four groups designated as areas A, B, C and D, the areas being described in an appendix not herein reproduced. The commission said that the undue prejudice and undue preference should be removed by the establishment on the traffic in question of the following rates in cents a net ton:

1. From Lehigh, Joliet, Plainfield, McCook and Bellewood, rates of 80, 85 and 90, and 105 to 125 cents to destination areas A, B, C and D, respectively, said rates to area D to be substantially on the single-line Kickapoo scale, using the average short-line distance from the seven producing points in the origin group, namely, McCook, Bellewood, Hodgkins, Thornton, Joliet, Plainfield and Lehigh; except that the single-line rates from McCook and Bellewood, in connection with the Indiana Harbor Belt to Dune Park, Ind., and from Joliet and Plainfield in connection with the Elgin, Joliet and Eastern and Michigan Central to Porter, Ind., and the respective intermediate destinations, shall be 70 cents; and provided that the single-line rates in connection with the New York Central from Lehigh to San Pierre and intermediate destinations, which we find to be reasonable, shall not be increased.

2. Single-line rates from the Indiana producing points named in the above finding to destination areas A and B, as so described, based on the single-line Kickapoo scale, subject, at intermediate destinations, to the Chicago-Gary rates as maxima.

3. Joint rates from Monon, Ind., to destinations in areas A and B west of the line of the Chicago, Indianapolis and Louisville, Michigan City division, which shall not be less than 80 cents, and to destinations in area B east of that line, which shall not be less than 85 cents.

It is, of course, understood that the rates from Lehigh, Joliet and Plainfield via the Chicago-Gary district, shall be subject to the latter rates as maxima, as this is necessary to avoid fourth-section violations.

The allegation of undue preference in connection with the other joint rates from the Indiana points, and in connection with the single-line rates from the Indiana points to destinations in areas C and D, is not sustained.

Through Rate on Cement Granted to Points in Oregon

A THROUGH RATE on cement shipments to take the place of the combination Portland (Ore.) rates, with a reduction of the minimum poundage in carload shipments, was granted by the Oregon Public Service Commission on October 22 from Lime, near Baker, Ore., to points on the Spokane, Portland and Seattle Railway west of Portland.

The rates will be joint rates on the Spokane, Portland and Seattle Railway and the Oregon Railroad and Navigation Co. lines, and were granted at the request of the two carriers. The rates from Lime to Holbrook and Scappoose, Ore., will be 22½ cents based on a minimum of 55,000 lb. to the carload; from Lime to Warren and St. Helens, Ore., on the same minimum, 23½ cents, and to Astoria, Ore., 24½ cents.

These through shipment rates are the same as before except that previously there was a combination rate on Portland, Ore., with a minimum of 80,000 lb. per carload into Portland, and a minimum of 80,000 lb. out of Portland to points west. The arrangement now effected is similar to the through rate from Gold Hill to points in eastern Oregon petitioned for jointly by the O. W. R. & N. and the Southern Pacific companies recently, and granted, although the Gold Hill rate is slightly lower.

Treasury Department Opposes Percentage System of Depletion

THE UNITED STATES Treasury Department is opposed to a percentage depletion for mines, B. H. Bartholow, special assistant to the Secretary, told the joint committee on internal revenue taxation at the close of a four-day consideration of the subject of mine depletion.

Mr. Bartholow said that while the internal revenue bureau is having difficulties in administering the percentage depletion method in the oil and gas industry, the problems of administration of the percentage system in mines would be "infinitely greater." The main reason, he continued, is that in determining income from property in oil and gas the Treasury takes the market or field price at the well. In the mining industry, he pointed out, there is no general prevailing field price. Large mining taxpayers do their own concentrating, milling, refining and smelting. "There would be an insuperable difficulty in dividing the profit up among these properties and allocating the part due to mining operations which would be the income from the mine," he added.

Testimony in support of the percentage depletion was given by B. A. Callahan, of Wallace, Idaho, president of the Callahan Zinc-Lead Co.; W. Earl Breenough, of Mullen, Idaho, vice-president of the Atlas Mining Co., and Dr. L. C. Graton, mining geologist of Cambridge, Mass.

Warner Company to Spend Nearly a Million on Development

INDICATING ITS CONFIDENCE in future business the Warner Co., Philadelphia, Penn., has just appropriated approximately $900,000 for new plant construction and expansion, Charles Warner, president of the company, announces. These funds will be expended in the establishment of additional retail terminals for distribution of "Central-Mix" concrete and to enlarge the facilities of terminals now in operation.

Expansion in this department of the company's business is necessary to meet the steadily increasing demand for delivery of the centrally mixed product throughout the district now covered and to extend deliveries over a wider area.

Use of centrally mixed concrete in building construction has shown rapid growth in the past 18 months, Mr. Warner states, current deliveries of the company being well ahead of those of a year ago.

Construction work on the company's new terminals will begin shortly after the turn of the new year. At present Warner Co. has four concrete distributing terminals in Philadelphia and one in Wilmington, Del.—*Wilmington News.*

Gypsum Association Holds Annual Meeting—Elects Officers

THE ANNUAL MEETING of the Gypsum Association was held at the Bismarck hotel, Chicago, Ill., Tuesday, December 9, 1930, with the following members in attendance:

American Gwpsum Co.
Atlantic Gypsum Products Co.
Best Bros. Keene's Cement Co.
Certain-teed Products Corp.
Grand Rapids Plaster Co.
National Gypsum Co.
Oakfield Gypsum Products Corp.
Structural Gypsum Corp.
United States Gypsum Co.
Universal Gypsum and Lime Co.

The present officers, consisting of James

Henry J. Schweim

Leenhouts, president; Charles F. Henning, first vice-president; L. I. Neale, second vice-president, and Eugene Holland, treasurer, were elected for the ensuing year. Henry J. Schweim was reappointed secretary.

The technical problems committee appointed a sub-committee consisting of C. K. Roos of the United States Gypsum Co., W. K. Nelson of the Universal Gypsum and Lime Co. and J. Miller Porter of the Structural Gypsum Corp. to prepare a program of problems which necessitate investigative research. This program is to be submitted to the technical problems committee at its spring meeting for approval before being acted upon by the association.

The proposed revision of the American Society for Testing Materials' Standard Specifications for Gypsum Plaster Board (C37-30) and the Standard Specifications for Gypsum Wall Board (C36-35), as well as Tentative Specifications for Gypsum Sheathing Board (C79-30T), were reviewed by the technical problems committee and suggested changes submitted to the association for consideration.

In the interest of standardization a discussion was had on the advisability of shipping plaster in one size paper packages. Plaster is now being shipped in 80-lb. and 100-lb. bags. It was the consensus of opinion that plaster be shipped in the 100-lb. packages exclusively. This move not only fits in with the government's recommendations for simplification and standardization in industry, resulting in lower inventory costs to both dealer and manufacturer, but it will tend to cut down over-sanding complaints. In numerous instances the same number of shovels of sand is used to the bag, regardless of whether it is an 80-lb. bag or a 100-lb. bag.

John Heimlich

JOHN HEIMLICH, founder of the Le Roy Lime and Crushed Stone Corp., Le Roy, N. Y., died December 9. He was born October 30, 1861, in Le Roy and lived most of his life there.

About ten years ago he organized the Le Roy Lime and Crushed Stone Corp. with other Le Roy business men. He retired shortly afterward to engage in agriculture, leaving the management of the stone company to his two sons, J. L. Heimlich, president of the company, and Walter Heimlich, superintendent.

Mr. Heimlich was a well known figure in Le Roy, and very active in civic affairs. He had a very affable character and left a host of friends. He was looked upon as a pioneer in the quarry industry of western New York state.

Besides the two sons mentioned he is survived by a widow and two daughters.

A 1752 Deed Cited in Suit

AN ANCIENT DEED of land, dated 1752, will be the point on which a corporation's right to excavate gravel in Long Island Sound in 1930 will be decided. O'Brien Brothers Sand and Gravel Corp. cannot excavate gravel on Barrel Island in Port Jefferson harbor, until the suit of the Great Eastern Gravel Corp. to permanently restrain the O'Briens is tried.

The Great Eastern corporation claims it has a contract made in 1929 with the trustees of the Town of Brookhaven, L. I., alleged owners of the island, giving it the exclusive right to excavate for gravel there.

The O'Briens claim the trustees have no right to make such a contract because the deed of 1752 does not include Barrel Island.

Portland Cement Output in November

Showing Considerable Slump from Figures for November, 1929

THE PORTLAND CEMENT INDUSTRY in November, 1930, produced 11,098,000 bbl., shipped 8,784,000 bbl. from the mills, and had in stock at the end of the month 23,011,000 bbl. Production of portland cement in November, 1930, showed a decrease of 21% and shipments a decrease of 21.7%, as compared with November, 1929. Portland cement stocks at the mills were 26.3% higher than a year ago.

The statistics here presented are compiled from reports for November, received by the Bureau of Mines from all manufacturing plants except two, for which estimates have been included in lieu of actual returns.

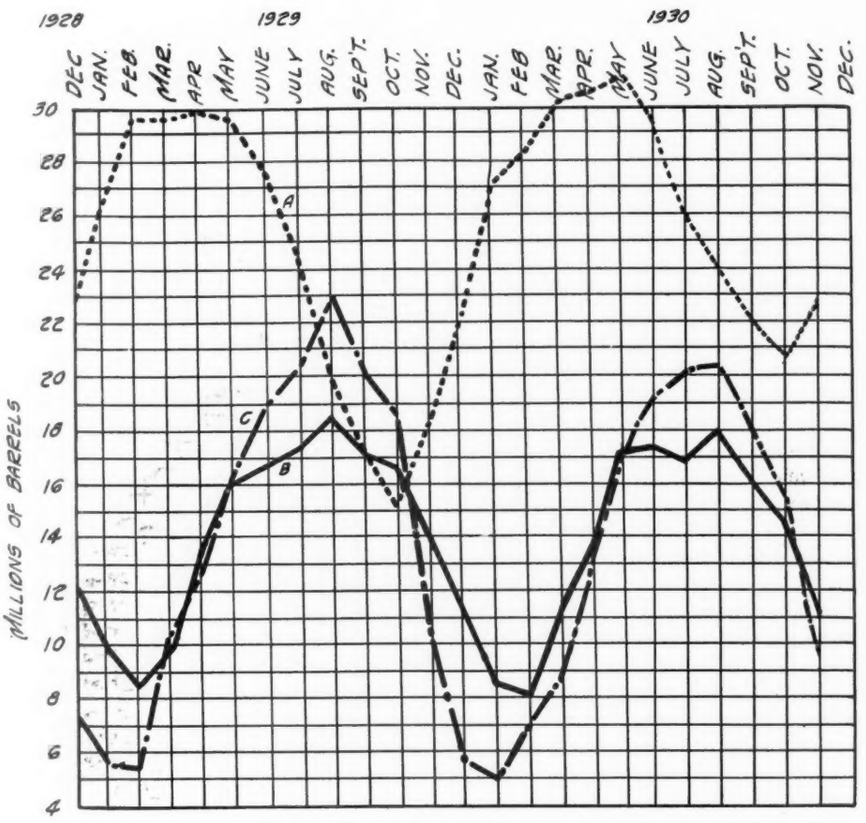
In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 165 plants both at the close of November, 1930, and of November, 1929. The estimates include increased capacity due to extensions and improvements during the period.

RELATION OF PRODUCTION TO CAPACITY

	Nov. 1929	Nov. 1930	Oct. 1930	Sept. 1930	Aug. 1930
	Pct.	Pct.	Pct.	Pct.	Pct.
The month	66.6	51.7	65.4	75.7	81.0
12 months ended	66.8	62.6	64.2	65.2	65.6

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during September and October, 1929 and 1930:



(A) Stocks of finished portland cement at factories; (B) Production of finished portland cement; (C) Shipments of finished portland cement from factories

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN SEPTEMBER AND OCTOBER, 1929 AND 1930, IN BARRELS*

Shipped to	1929—Sept.—	1930	1929—October—	1930
Alabama	179,011	68,936	172,980	88,358
Alaska	282	1,362	662	697
Arizona	56,000	39,785	52,544	33,524
Arkansas	206,476	150,714	190,656	144,307
California	915,829	837,669	1,075,308	931,721
Colorado	91,602	82,050	97,352	78,683
Connecticut	206,737	195,962	229,221	153,822
Delaware	34,281	26,704	36,005	20,017
District of Columbia	107,654	137,507	104,051	154,670
Florida	88,730	76,333	106,271	89,354
Georgia	117,262	163,464	124,215	174,340
Hawaii	24,896	16,778	22,716	23,850
Idaho	27,375	46,308	28,709	34,385
Illinois	1,721,624	1,704,696	1,406,895	1,586,016
Indiana	909,295	497,163	686,986	321,285
Iowa	968,958	781,608	716,047	317,288
Kansas	332,819	250,548	336,060	226,472
Kentucky	176,115	241,402	178,287	223,805
Louisiana	171,673	163,544	245,643	172,194
Maine	94,201	148,381	80,564	87,454
Maryland	294,089	285,312	291,625	257,617
Massachusetts	356,318	331,061	365,195	376,533
Michigan	1,601,684	1,018,648	1,161,054	867,458
Minnesota	430,298	374,833	352,958	237,592
Mississippi	107,651	51,680	99,934	39,377
Missouri	748,870	710,759	681,598	713,573
Montana	77,505	44,217	55,468	27,189
Nebraska	224,168	241,572	213,158	174,005
Nevada	14,180	16,111	15,028	18,751
New Hampshire	75,573	84,449	67,001	48,117
New Jersey	825,204	610,200	911,203	664,381
New Mexico	21,621	28,870	28,479	27,047
New York	2,237,801	2,515,171	2,295,014	2,063,858
North Carolina	129,411	102,658	147,399	101,403
North Dakota	49,597	38,358	42,474	24,513
Ohio	1,207,197	1,103,327	1,218,439	1,011,292
Oklahoma	365,927	348,023	376,193	270,430
Oregon	122,669	112,133	114,228	130,953
Pennsylvania	1,632,356	1,557,564	1,550,799	1,351,511
Porto Rico	4,190	10,250	5,195	5,000
Rhode Island	81,919	100,664	78,405	76,031
South Carolina	64,446	245,776	88,492	273,208
South Dakota	83,173	86,654	94,859	44,410
Tennessee	328,182	294,910	†330,340	271,922
Texas	697,091	573,392	759,309	438,457
Utah	73,952	39,116	60,619	38,549
Vermont	135,894	66,810	109,422	53,087
Virginia	161,521	174,179	152,804	155,410
Washington	305,056	328,595	240,543	324,276
West Virginia	164,543	196,307	168,957	139,483
Wisconsin	759,187	700,327	597,697	414,797
Wyoming	24,015	20,224	28,708	20,691
Unspecified	52,207	4,888	†28,000	40,039
	19,888,315	18,047,952	18,621,769	15,563,202
Foreign countries	61,685	35,048	73,231	35,798
Total shipped from cement plants	19,950,000	18,083,000	18,695,000	15,599,000

*Includes estimated distribution of shipments from three plants in September and October, 1929; from two plants in September and October, 1930.
†Revised.

PRODUCTION AND STOCKS OF CLINKER, BY MONTHS, IN 1929 AND 1930, IN BARRELS

Month	1929—Production—	1930	Stocks at end of month 1929	1930
January	12,012,000	10,504,000	9,642,000	9,646,000
February	11,255,000	10,008,000	12,436,000	11,572,000
March	12,450,000	13,045,000	14,948,000	13,503,000
April	14,166,000	15,025,000	15,479,000	15,164,000
May	15,444,000	16,607,000	14,911,000	14,668,000
June	15,312,000	15,895,000	13,587,000	13,452,000
July	15,214,000	15,067,000	11,619,000	11,684,000
August	15,829,000	15,244,000	8,995,000	9,275,000
September	15,165,000	14,577,000	7,009,000	7,783,000
October	15,515,000	13,895,000	5,934,000	*7,266,000
November	14,087,000	11,731,000	6,134,000	7,855,000
December	12,539,000	.....	7,526,000	.....

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN NOVEMBER, 1929 AND 1930, AND STOCKS IN OCTOBER, 1930, IN BARRELS

District	Production 1929—Nov.—1930		Shipments 1929—Nov.—1930		Stocks at end of month 1929	1930	Stocks at end of Oct., 1930*
Eastern Penn., N. J., Md.	2,973,000	2,390,000	2,949,000	2,124,000	4,020,000	4,521,000	4,255,000
New York and Maine	848,000	924,000	738,000	617,000	1,107,000	1,395,000	1,088,000
Ohio, West'n Penn., W. Va.	1,537,000	1,085,000	1,197,000	830,000	2,580,000	3,285,000	3,030,000
Michigan	1,228,000	943,000	667,000	538,000	1,636,000	2,722,000	2,317,000
Wis., Ill., Ind. and Ky.	1,760,000	1,233,000	1,219,000	857,000	1,869,000	2,922,000	2,546,000
Va., Tenn., Ala., Ga., Fla., La.	1,085,000	877,000	1,025,000	807,000	1,557,000	1,767,000	1,697,000
East'n Mo., Ia., Minn., S.D.	1,344,000	1,131,000	742,000	739,000	1,876,000	1,934,000	1,542,000
Western Mo., Neb., Kansas, Oklahoma and Arkansas	1,176,000	743,000	788,000	632,000	1,009,000	1,763,000	1,652,000
Texas	661,000	502,000	523,000	453,000	670,000	770,000	721,000
Colo., Mont., Utah, Wyo., Ida.	120,000	40,000	119,000	118,000	453,000	336,000	414,000
California	1,091,000	817,000	1,038,000	728,000	991,000	1,052,000	963,000
Oregon and Washington	230,000	413,000	217,000	341,000	445,000	544,000	472,000
	14,053,000	11,098,000	11,222,000	8,784,000	18,213,000	23,011,000	20,697,000

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1929 AND 1930, IN BARRELS

Month	1929—Production—1930		1929—Shipments—1930		Stocks at end of month 1929	1930
January	9,881,000	8,498,000	5,707,000	4,955,000	26,797,000	27,081,000
February	8,522,000	8,162,000	5,448,000	7,012,000	29,870,000	28,249,000
March	9,969,000	11,225,000	10,113,000	8,826,000	29,724,000	30,648,000
April	13,750,000	13,521,000	13,325,000	13,340,000	30,151,000	30,867,000
May	16,151,000	17,249,000	16,706,000	17,224,000	29,624,000	30,891,000
June	16,803,000	17,239,000	18,949,000	18,781,000	27,505,000	29,364,000
July	17,315,000	17,078,000	20,319,000	20,153,000	24,525,000	26,289,000
August	18,585,000	17,821,000	23,052,000	20,299,000	20,056,000	23,824,000
September	17,223,000	16,124,000	19,950,000	18,083,000	17,325,000	21,889,000
October	16,731,000	14,410,000	18,695,000	15,599,000	15,381,000	*20,697,000
November	14,053,000	11,098,000	11,222,000	8,784,000	18,213,000	23,011,000
December	11,215,000	.....	5,951,000	.....	23,538,000	.....
	170,198,000	.....	169,437,000	.....	.....	.....

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN NOVEMBER, 1929 AND 1930, IN BARRELS

District	1929—Production—1930		Stocks at end of month 1929	1930
Eastern Pennsylvania, New Jersey and Maryland	2,821,000	2,235,000	891,000	897,000
New York and Maine	935,000	1,029,000	540,000	547,000
Ohio, Western Pennsylvania and West Virginia	1,577,000	1,263,000	537,000	834,000
Michigan	1,255,000	917,000	502,000	801,000
Wisconsin, Illinois, Indiana and Kentucky	1,840,000	1,337,000	442,000	755,000
Virginia, Tennessee, Alabama, Georgia, Florida, Louisiana	1,066,000	972,000	593,000	964,000
Eastern Missouri, Iowa, Minnesota and South Dakota	1,260,000	1,185,000	430,000	475,000
West'n Missouri, Nebraska, Kansas, Oklahoma, Arkansas	1,147,000	885,000	184,000	446,000
Texas	731,000	498,000	372,000	331,000
Colorado, Montana, Utah, Wyoming and Idaho	116,000	29,000	270,000	314,000
California	1,088,000	1,002,000	945,000	1,185,000
Oregon and Washington	251,000	379,000	428,000	306,000
	14,087,000	11,731,000	6,134,000	7,855,000

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1929 AND 1930

Month	1929—Exports		1930—Exports		1929—Imports		1930—Imports	
	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value
January	78,639	$283,002	82,387	$293,135	151,302	$177,976	201,609	$207,461
February	58,886	225,590	64,267	217,798	118,930	123,123	114,455	119,717
March	69,079	235,164	117,563	357,896	131,909	112,788	43,622	59,981
April	64,145	218,316	57,419	200,217	89,668	114,281	140,871	178,226
May	57,955	219,366	57,423	198,170	200,646	267,854	94,696	111,998
June	96,055	287,612	82,077	223,639	203,545	228,170	55,356	74,370
July	71,992	247,177	47,082	166,577	182,098	199,960	12,404	20,973
August	60,013	225,762	49,031	167,579	183,938	199,403	35,323	39,029
September	86,268	308,631	46,594	153,384	112,372	152,239	51,096	59,721
October	101,359	337,839	62,690	190,305	172,566	187,504	75,284	84,364
November	53,378	198,197	.....	.....	96,568	95,844	.....	.....
December	88,403	297,255	.....	.....	84,358	79,098	.....	.....
	886,172	$3,083,911	.....	.....	1,727,900	$1,938,240	.....	.....

*Revised.

Exports and Imports†*

Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN OCTOBER, 1930

Exported to	Barrels	Value
Canada	3,496	$ 14,077
Central America	13,233	27,218
Cuba	3,774	10,558
Other West Indies and Bermuda	6,760	10,861
Mexico	6,018	17,810
South America	26,054	90,648
Other countries	3,355	19,133
	62,690	$190,305

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN OCTOBER, 1930

Imported from	District into which imported	Barrels	Value
Belgium	New York	4,539	$4,238
Canada	Maine and N. H.	279	$827
	Porto Rico	1,264	1,413
	Vermont	23	60
	Total	1,566	$2,300
Denmark	New York	27,034	$27,599
	Porto Rico	21,320	26,495
	Total	48,354	$54,094
France	Massachusetts	492	$1,011
Italy	South Carolina	9	$20
Japan	Hawaii	425	$445
United K'gd'm.	New York	1,012	$2,380
	Philadelphia	18,887	19,876
	Total	19,899	$22,256
	Grand total	75,284	$84,364

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII, AND PORTO RICO, IN OCTOBER, 1930

	Barrels	Value
Alaska	3,914	$ 9,577
Hawaii	15,981	44,380
Porto Rico	14,544	25,193
	34,439	$79,150

*The value of exports of domestic cement is the actual cost at the time of exportation in the ports of the United States whence they are exported, as declared by the shippers on the export declarations.

†The value of imported cement represents the foreign market value at the time of exportation to the United States.

Building Material Prices

THE figures given below, compiled by the Department of Commerce, show average prices paid by contractors for materials delivered on the job.

AVERAGE RETAIL PRICES FOR ROCK PRODUCTS MATERIALS, NOVEMBER 1, 1930

City	MATERIAL: Portland cement, per bbl., exclu. of cont.	Gypsum wallboard, ⅜-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾-in., per ton	Gypsum plaster, neat, per ton
New Haven, Conn.	$2.90	.....	$20.00	$1.25	$2.25	.....
New London, Conn.	2.80	$25.00	.....	1.50	2.40	$18.00
Waterbury, Conn.	3.00	30.00	20.00	1.35	2.45	20.00
New Bedford, Mass.	2.60	27.00	18.50	1.75	3.00	17.50
Albany, N. Y.	2.97	24.75	18.00	.....	.....	17.10
Buffalo, N. Y.	2.95	21.00	18.00	2.50	2.05	16.00
Poughkeepsie, N. Y.	2.18	.....	.....	2.25	2.00	.....
Rochester, N. Y.	3.25	22.00	20.00	1.75	2.40	17.00
Syracuse, N. Y.	3.00	22.50	18.00	2.00	2.25	17.00
Paterson, N. J.	2.40	25.00	18.00	1.50	2.10	17.50
Trenton, N. J.	2.40	26.00	18.00	1.50	2.10	17.50
Philadelphia, Penn.	2.30	.....	15.00	1.80	2.65	18.00
Scranton, Penn.	2.80	.....	20.00	.....	.....	19.00
Baltimore, Md.	2.53	.....	13.00	2.40	2.75	14.50
Washington, D. C.	2.55	25.00	14.00	.....	.....	16.00
Richmond, Va.	3.10	31.00	17.50	1.95	2.45	20.00
Fairmount, W. Va.	2.80	.....	16.00	3.15	3.50	18.00
Columbia, S. C.	2.63	.....	13.50	2.50	2.75	14.15
Atlanta, Ga.	2.85	.....	17.50	3.38	3.25	18.00
Savannah, Ga.	2.25	25.00	20.00	1.75	.....	16.00
Tampa, Fla.	3.00	.....	24.00	1.50	3.50	22.50
Birmingham, Ala.	3.00	.....	19.00	2.85	2.25	17.00
Shreveport, La.	3.20	.....	.....	2.00	4.75	22.00
Erie, Penn.	2.40	22.50	19.00	2.25	.....	16.00
Akron, Ohio	2.67	.....	18.00	1.85	1.85	.....

City	MATERIAL: Portland cement, per bbl., exclu. of cont.	Gypsum wallboard, ⅜-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾-in., per ton	Gypsum plaster, neat, per ton
Cincinnati, Ohio	$2.96	$24.75	$16.40	$2.63	$2.55	.....
Cleveland, Ohio	2.40	22.00	12.00	1.95	2.70	$14.50
Columbus, Ohio	2.70	.....	14.00	.....	2.25	15.00
Toledo, Ohio	2.60	20.00	16.00	2.00	2.50	14.50
Youngstown, Ohio	2.60	.....	15.00	3.40	2.50	15.00
Detroit, Mich.	2.60	25.00	14.80	2.23	3.00	17.60
Saginaw, Mich.	2.35	25.00	18.00	2.50	3.25	17.00
Terre Haute, Ind.	2.85	28.00	18.00	1.65	3.50	20.00
Louisville, Ky.	2.52	.....	15.50	2.20	2.43	16.00
Chicago, Ill.	2.25	21.00	17.00	2.00	2.00	15.00
Milwaukee, Wis.	2.25	25.00	16.00	1.50	1.30	18.00
Des Moines, Iowa	3.08	.....	20.00	1.10	.....	.....
Kansas City, Mo.	2.50	25.00	24.00	1.70	1.88	15.00
St. Louis, Mo.	2.15	.....	18.00	1.35	1.00	18.00
St. Paul, Minn.	2.45	.....	18.00	2.23	1.75	18.00
Grand Forks, N. D.	2.80	25.00	.....	2.60	.....	16.00
Sioux Falls, S. D.	3.00	.....	24.00	1.25	2.25	15.00
San Antonio, Texas	2.60	.....	20.00	2.10	2.35	19.15
Tucson, Ariz.	3.37	.....	30.00	1.25	2.50	17.10
Denver, Co.o.	3.20	35.00	22.00	1.25	1.50	18.00
Portland, Ore.	2.60	30.00	23.00	1.50	.....	18.00
Los Angeles, Calif.	2.30	.....	22.00	1.85	1.90	15.20
San Francisco, Calif.	2.60	.....	22.50	1.40	1.60	19.90
Seattle, Wash.	1.75	35.00	22.00	1.40	.....	20.00

Saving Money Through Accident Prevention*

How the General Crushed Stone Co., Easton, Penn., Carries Its Own Insurance and Carries on Its Safety Work

By Otho M. Graves

Vice-President and General Manager, General Crushed Stone Co., Easton, Penn.

I HOPE YOU REALIZE as definitely as I do that we are not praising ourselves for what we have done. The contrary is true. We have done only enough to indicate to ourselves what more there is to be done, and how insufficient our efforts have been in the results we hoped to attain.

Three years ago, in October, I had the pleasure of attending a meeting of the National Safety Congress in Chicago. I knew little or nothing about accident prevention work. It was much to my astonishment that I learned I was to appear on the program of that Congress to talk on accident prevention work. However, if my talk had no value to anyone else, it had to me because it forced me to investigate the subject, of which I was fundamentally ignorant, and threw me into the atmosphere of men who were trying earnestly to prevent accidents.

It sent me home with an enthusiasm which I believed it impossible for me to possess. I believed as the other officers of the company did, that we did as much as possible to prevent accidents; we told the superintendents we didn't want men to be hurt, and expected them to pass this along to the men.

If anyone called our attention to physical hazards that needed remedying, we quickly remedied them; that was the extent of our work—a rather receptive sort of interest. We were ready for suggestions, and to follow them when they should be made, but we were not on the alert, seeking the things that were hazards and seeking methods to change and improve things to lower the frequency and severity rate.

Beginning of Organized Safety Work

At that time we had a severity rate of about seven days for 1000 man-hours of exposure; this 1000 naturally means 100 men working a 10-hour day; that is to say, every time 100 men work for a day, seven days of time was lost. The frequency was one in a million man-hours of exposure.

I think, as those figures might be compared to the average, they were not so reprehensible as to cause great concern; they were neither good, bad nor indifferent, neither fish, flesh nor good red herring—somewhere near the average of the industry, not bad enough

Otho M. Graves

to disturb our conscience, nor good enough to awaken our enthusiasm to better them.

We gave a good deal of thought to what could be done to prevent accidents after this Congress three years ago. We were just as fully alive to the humanitarian standpoint as anyone else; perhaps no more, but fully as much. Perhaps we were somewhat more alive to the humanitarian side of it by reason of the interest our president, John Rice, has in every member of our organization; but it seemed to us that if we could in some manner tie up the expense to which we were put by virtue of accidents to a more energetic campaign to prevent accidents, we would have that material and financial interest in the success of the plan which would do fully as much if not more to stimulate effort than if we had only the humanitarian point of view.

It seems like an admission from a material mind to say that when things become costly we become immediately alarmed. Our consciences are so pliable, so adjustable to conditions as we find them; it is easy to keep our conscience square on the line all the time, to say, "Are we not doing as well as could be reasonably expected?" and content ourselves with axiomatic expressions, letting us out of responsibility; but when it is brought home that every time an accident occurs it makes a direct drain on the finances of the company, someone is going to begin pressing on why it happened and what can be done to prevent it recurring.

Therefore we decided—I am telling you the way we were thinking things out, and are still—it would be an advantage to try the experiment of carrying our own insurance.

Cost of Previous Insurance

At that time our premiums amounted to $50,000 a year to insurance carriers. That was for a number of plants, not nearly so great as now. It seemed to us there was a fund of $50,000 with which we might play; if we could do it for less we would be better off financially; should it cost more—I doubt if it could, unless there was some catastrophe, unless there should be an abortive explosion; dynamite is treacherous; you never know quite how it will act; in carrying it up a hill, dropping 60, 70, sometimes 80 lb. of nitroglycerine into the hole 5, 10, 25 ft., it is impossible to say what will occur always, and if that unexpected thing happens there might be an explosion that would kill five or six men.

You New York men can estimate how much it costs to lose a life in that commonwealth; anywhere up to $60,000 or $75,000. Losing six or seven might be so costly that it would outweigh any advantage you might get out of a $50,000 fund such as we were playing with.

That led to investigation as to whether a "stop loss" order might be taken out—a catastrophe insurance. We found it could be obtained, but that it would be difficult. The insurance companies search the records of a company with extreme care, to observe how it operates and decide whether it would be a warrantable risk. We were helped in that connection by the Independence Bureau in Philadelphia which undertook to assist us in accident prevention work and which spoke reassuringly to the insurance carrier which was large enough to carry insurance of that type. So we secured in-

*From an extemporaneous address at the National Safety Congress, Pittsburgh, Penn., October, 1930.

surance to the extent of $250,000 covering any one accident above $10,000. That is to say, if we killed a man in any manner whatsoever we would be liable for the first $10,000 of compensation, but above that our liability would cease and the insurance policy would pick it up and carry the loss up to $250,000, above which we would be liable. We assumed it would be beyond the realm of possibility that any one accident could cost us more.

Now, I am sure what I mean there is clear, and if an explosion occurred unexpectedly, and four, five or six men were killed by that one accident, our loss was limited to $10,000, no matter how many were killed.

With that protection giving us a better feeling of security, we undertook to carry our own insurance.

Inauguration of Self-Insurance

The point is that as soon as we realized that we were launched on this plan, that no one was going to pay our losses but ourselves; that all compensation, all medical expense, was to be paid by ourselves, it became obvious that it was incumbent upon us to reduce those accidents to the lowest possible limit. That we undertook to do.

I am not going into the ways and means of accomplishing that. We have found during the two years and a half we have been doing it, for 1928, 1929 and approximately the first half of 1930, that our net premiums to insurance companies would have been approximately $128,000.

We actually spent in compensation for accidents $22,000; our medical attention amounted to $7600; administration costs were $36,000. The administrative cost can be decreased as time goes on; for instance, for the first year it was $13,000 and for the first half or two-thirds of this year it was only $9000. That difference is not altogether accounted for by the fact that the year is not completed, but is also attributable to over-zealous effort at the start, and expenditures which were perhaps justified at first, which we have found can be saved, making the total cost to us during this two and a half year period approximately $66,000 as compared to the amount we would have paid in premiums.

That is, you may think, not so great a saving, but as I know the profits of crushed stone companies, it is a fair profit in itself, and furthermore, made in the finest sort of way. Not by reducing the cost of operations and increasing prices to consumers, not by being a little sharper or shrewder than your competitor, but by benefiting the people working for your company. I know no better way than by helping someone else to protect himself from being hurt, to keep himself from the suffering, and his family from the grief and sorrow that comes when any member is injured or killed.

So I am gratified by the saving of the $62,000 made in this period, not simply because the saving represents a reasonable profit on what we have undertaken to do, but also because of its humanitarian aspects; that is the thing I want to emphasize.

More Than One Kind of Saving

That is the way to think of it, it seems to me. Perhaps I have rather lost my perspective on the subject; but it does seem to me that neither purpose is complete without the other, that the two should go hand in hand. If we reduce accidents, we should benefit financially, but we should have two reasons: avoidance of sorrow, grief and suffering to the man and to his family, and the profits which would rightfully accrue to the company effecting the saving.

I realize that a plan of this sort is not applicable to all companies; I can understand that the number of men employed by a company might be insufficient to warrant such an undertaking; I am not prepared to admit, but I might be convinced.

It seems to me a man operating one plant, with 25 employes, has a better opportunity to prevent accidents than a company operating 15 or 20 plants with 1000 employes; by the very nature of the widespread activity and operation, it is more difficult to give each plant the personal, earnest attention which it deserves. Whether from the operating, selling or accident prevention point of view, that fortunate man who lives with the plant he owns, lives right there with it all the time, it seems to me ought to be able to operate more economically, and sell to better advantage, and prevent accidents to a greater extent than the large company.

That may be so, but in so far as there is any truth in it, he has the opportunity to prevent accidents which would warrant him in carrying his own insurance.

Insurance Companies Not Eliminated

I would regret to have what I say reach the ears of an insurance company to indicate a lack of knowledge on my part of the value of insurance. We all realize we must be insured in some form or manner against the vicissitudes of life, whether personally or affecting the conduct of our business. There is not a man here who would dare to drive his car in the city or state without insurance; many carry public liability insurance, which we carry, for instance. In one plant we still carry compensation insurance with an insurance carrier in Massachusetts. I have observed with the greatest pleasure the work the insurance carrier has done there is assisting us to reduce accidents to a minimum. I am in sympathy and accord with insurance.

We could not be without some protection behind what we are doing; that would be some form of insurance, whether a deferred account on the books of the company or some form of insurance, that would depend on the individual case. I am simply talking about workmen's compensation insurance, and for us it has proved profitable to the extent indicated. I am aware, as our record has improved, our annual rate would be reduced with the carriers and it is difficult to set up this figure of $128,000 as the probable amount we would have paid, as it would have been decreased by our record.

As for what we have done in this length of time, aside from the financial phase of it, one of our plants operated 18 months without lost time through injury; another 28 months without any lost time; in 1929 we placed two quarries among the first six in the National Crushed Stone Association competition, and in the open competition sponsored by the Bureau of Mines for all mining operations, we placed one sixth and one 16th.

Another plant operated 20 months without lost time through accidents, and two sand and gravel operations had no lost-time accidents for 23 months.

Cost of Accidents to Industry

MANY OPERATORS of various industries do not seem to realize the large returns in dollars and cents which result from intelligently directed safety work. While the prevention of accidents is worth while from a humanitarian standpoint alone, it has an equally important economic side which is too often overlooked. Aside from humanitarian motives and aside from compensation insurance, it pays well in reduced costs of operation, both direct and indirect, to carry on vigorous and continuous accident prevention work. Safety and efficiency go together; that is, a decrease in the number of accidents results in increased efficiency and lower costs.

Accidents cost more money than the medical bills, compensation and insurance premiums paid; in fact, some authorities now hold that the ultimate cost of accidents is four or five times the amount so paid out.

This important subject and the various kinds of losses due to accidents are discussed in detail by F. S. Crawford in Information Circular No. 6333, recently published by the U. S. Bureau of Mines.

Among the direct losses discussed are: the absence for treatment in the case of a slightly injured man; the extended absence of a seriously injured man; and the time lost and assistance necessary at the time of the accident.

The indirect losses cited are more numerous and include: the loss of time in training new employes and the decreased production by such new men; damaged equipment and material resulting from an accident; time required for making reports of accidents, and attending hearings when there is any dispute; partial or complete plant shutdowns, as a result of accidents, and the loss of good will caused by an interruption of continuous operation; waste of material and damage to equipment during training period of new men; distraction of other workmen by an accident and decreased productivity.

Safety in the Foreground at Trinity Plants

By J. W. Ganser

Assistant Superintendent and Chief Chemist, Trinity Portland Cement Co., Dallas, Texas

THERE was a time, and that was not so many years ago, when safety practices were almost unknown in a cement plant. It has not been over fifteen or twenty years ago that men knew about as much about safety as a six or eight year old child knows today. The worker knew that moving gears would chew off his hand or foot, he knew that cuts and bruises might become infected, but if he cut himself he would either cover it with axle grease or a cud of tobacco and expect it to get well.

In those days nothing was guarded, many platforms had no railings, and if any one fell from these platforms, or was killed by being caught between gears, nine times out of ten nothing was done to prevent any one else from receiving the same injury. You remember 'way back when it was expected that one or more men in each cement plant would be killed or permanently injured each year. No one in those days even knew the first principles of safety. Think, therefore, of these poor unfortunate men who through ignorance of the principles of safety, have had to give up their lives. There is some one man, or a group of men, who deserve a medal of merit for starting the safety movement in the cement industry. Had we continued as we were going fifteen or twenty years ago there is no doubt that there are thousands of men alive today who would have been dead, and with those conditions it would now be difficult to get good capable men to operate our mills.

The records show that the Dallas Trinity plant was no exception—being just as careless with their men; nothing guarded, and not a word spoken about safety for the men. It was not until about the year 1920 that we realized it was someone's job to start educating the men to be safe, and to start guarding all hazardous places in the mill. Monthly meetings of the foreman were held to talk over means and methods to eliminate accidents; and incidentally, by having these meetings we would get a small reduction in our accident premiums.

I can well remember the lack of enthusiasm at these first meetings. The few that attended, and they were mostly the foremen, sat around in a disinterested way. Finally these dry gatherings were discontinued for several months. Then they were started again, and for a long time they were anything but peppy. During these years we were having from one to two fatalities and one to two permanent disabilities a year.

After about three years of this training we finally had a year without a fatality. This seemed to revive the spirit, and since then (1923 being the year of our last fatality) we have increased our original infinitesimal interest in safety to a colossal spirit. Having eliminated the fatalities, we also started on the permanent disabilities and are fortunate enough to have had none since 1926.

Sometimes Necessary to Be "Hard Boiled"

In order to bring about this improvement it was often necesssary to be "hard-boiled," because we were now after the elimination of lost-time accidents. It was most difficult to make some of our men understand what we were trying to accomplish, as we employed whites, Mexicans and blacks. Very few of the Mexicans understood a word of English. They would always say, "No savey," unless threatened with a discharge; then they always understood everything perfectly. So it was, also, with the Negroes, many having only one or two years of schooling, and were a long time realizing what it was all about.

For several years we painted slogans on paper 16x24 in. in size, in English and Spanish, and posted these in every department of the mill. These slogans were changed every week; and while our semi-monthly meetings were getting more interesting, our lost-time accidents did not decrease. We were then again starting to get discouraged, when we decided to make a determined drive, take the bull by the horns, and either accomplish what we were after, or be an "also ran."

The idea we worked out was to try and shame every man who had a lost-time accident. Having an artist in the plant, we painted on a board, in colors, a cartoon of the man having a lost-time accident, and the manner, or cause, of his having the accident. No one wanted a comic picture of himself on that board, and we were thereby able to have three months that year without a lost-time accident.

This was the first time since we started to keep a record that we had three no-lost-time-accident months in one year. Thinking that we had made a good start, we divided the men in the mill into six groups. We now decided to touch their pocketbooks. Every man had agreed that if a group had a lost-time accident, each man in that group would pay one dollar, which would be put into a common fund; then at the end of the year the company would duplicate the amount in the fund. This was to be equally distributed among the men in the groups not having a lost-time accident. When the end of the year came there was not a penny in the fund. Therefore, in order not to disappoint the men and help keep up their morale, the company gave each man a cash bonus.

The men then started to realize some of the benefits of safety. Even the Mexicans started to prick up their ears, realizing that we were not only trying to help them to go through life without a serious injury, but were showing our appreciation of their efforts by a cash bonus.

Trinity Portland Cement Co. Safety Committee. Standing (left to right)—Ben Hammond, T. C. Pulley, R. C. Youngblood, S. A. Davidson, E. S. Pickens, D. D. Day, J. R Poindexter, J. D. Summers. Seated—G. M. Orr, W. O. Stuart, H. F. Lamb, L. M. Fisher, C. A. W. Sutherland, A. C. Carr, J. W. Ganser

The following year was started out with much enthusiasm. There was much excitement about two men going to New York with all expenses paid. The Negroes never forgot the barbecue that was to be given at the trophy dedication. It was the idea of having another barbecue, with plenty to eat and drink, that helped the Negroes to go through the year without a lost-time accident.

The men are now all out of the primary grade of safety education. They are now all eager to help one another from being injured, and all take quite an interest in the meetings. All are eager to come to the safety meetings, while several years ago they almost had to be driven.

Demonstrators Helped Greatly

Much credit is due the Bureau of Mines for sending demonstrators to the cement plants to give the men a very thorough training in first aid. We availed ourselves of this opportunity, and had 75 men, white, colored and Mexicans, take the training. Since then many others have been taught the first principles of first aid. It is these things that have shown the men the value of safety and first aid, and have helped the whole cement industry to reduce accidents.

In order to keep the men thinking of safety, we have recently started a plan whereby a different man makes the plant inspections each week. In this way we get all the different viewpoints and help to keep the guards in place and keep all mechanical defects in a safe condition.

The newest innovation in our meetings has been the installation of a large disc, with the payroll number of each man on the outer edge. At each meeting this disc is spun, and the four men whose numbers come to the pointer when the disc stops are expected to make a safety talk at the next meeting. Only rarely has any of the men declined to say anything, and there have been several who have given remarkable safety talks for from five to ten minutes. Having these men from the plant make talks has caused our meetings to become more popular than ever. I think if it were possible for us to shut down the entire plant during these safety meetings, that every man would be happy to attend.

Men Always Warned of Danger

Because of this intensive training, no job is started until the men are warned of the dangers attached to the work. I know that these principles have been invaluable to the men, because we are now completing without accident a job started two months ago, on which, had it been undertaken fifteen years ago, at least one man would have been killed or permanently disabled. This job I speak of was of structural steel fairly high above the ground and all the work done by our own mill men. Not a trained structural steel man was hired; yet this green gang was able to complete the job without injury to anyone. It was headed by a foreman who is captain of our first aid team, thoroughly sold on safety, and giving daily safety warnings, and he has been able to keep every man on the job in a safety-thinking mood.

Publications Read in Homes

Due credit must also be given *The Safe Worker*, a monthly magazine published by the National Safety Council. This is distributed to all the men, and many of these magazines now find their way into the home. While few of the Mexicans can read the English language, many of them have children now going to our public schools, and it is from these that the fathers and mothers are learning more each month about how to work safely.

The Portland Cement Association, through the *Accident Prevention Magazine*, and the monthly bulletins of *Significant Accidents*, has been a valuable aid in keeping the men informed as to what other mills are doing and how to profit by the accidents experienced in the other plants of the association. We make a particular effort to stress these significant accidents, so that we may not have a duplication in our own mill.

Joah Etchells Becomes President, Richard K. Meade & Co., Inc.

JOAH ETCHELLS, who was connected with the late Richard K. Meade for the past 14 years, announces that the business of Richard K. Meade & Co., chemical and industrial engineers, will be continued by him as president and general manager, under the name of Richard K. Meade & Co., Inc. The business of the concern, as previously, will be consulting, advising and technical service to the portland cement, lime, gypsum and allied industries.

The offices of the corporation will remain at 10 West Chase street, Baltimore, Md.

New Quarry Enterprise for Western Pennsylvania?

A NEW STONE QUARRY is to be opened in the Park Gate section, Ellwood City, Penn., by the Dravo Construction Co., of Pittsburgh. Engineers have been drilling test holes.—*Pittsburgh* (Penn.) *Sun-Telegraph.*

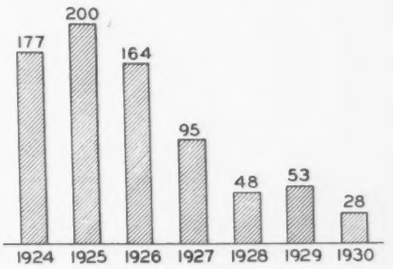
Bronze Welding

ACCORING to an article in *Oxy-Acetylene Tips*, November, 1930, the progress in bronze welding during the past year or two has been unusually rapid. It is stated that this method of welding is now being used successfully and economically on cast iron, malleable iron, wrought iron, galvanized iron, steel, copper, brass and even nickel and monel metal, in both repair and production operations.

November Accidents

THE ACCIDENT TOTAL for November in the member cement mills of the Portland Cement Association was the lowest on record. While it may be raised slightly by a few belated reports, the showing is an extraordinary one. Twenty-eight lost-time accidents were recorded, only 53% as many as for the corresponding month of 1929 and 14% as many as suffered in November, 1925, the highest November figure in recent years.

Figures shown on the accompanying diagram represent the total of lost-time, permanent disability and fatal accidents. In November, 1927, there were 91 lost-time and 4 fatal mishaps; in November, 1928, 82 lost-time and 5 fatals; in November, 1929, 56 lost-time and 1 fatal; in November, 1930, 28 lost-time and no fatals.



Decreasing number of accidents in cement plants

At the end of November there remained on the lists of the Portland Cement Association the names of 47 plants out of a total of 138 reporting, which have had no lost-time or more serious accidents since January 1. Last year at the same date 30 plants had operated without accident from the first of the year.

Famous Estate for Gravel Pit

THE O'Brien Brothers Sand and Gravel Corp., New York City, has bought the estate of Mrs. Philip Curran at Belle Terre, near Riverhead, Long Island, N. Y., for an inland sand and gravel operation.

The Curran property lies in the midst of a number of beautiful and exclusive estates on the wooded promontory which has often been described as the most attractive residential area on Long Island Sound.

It is the purpose of the O'Brien company to erect a $700,000 plant on the site in connection with the gravel digging operations. They are said to have paid $500,000 for the property, which contains approximately 100 acres.

It was also learned that application has been made to the War Department to approve a permit in favor of the Sound Gravel Co., a Chicago concern with offices in the Civic Opera Building, Chicago, to use a sea-going ocean suction dredge in the Sound near Huntington and near the incorporated village of Lloyd Harbor.—*Riverhead* (N. Y.) *Review.*

Long Island Gravel Producer Proposes Dredging a Half-Mile Off Shore

THE SOUND GRAVEL CO., a Chicago, Ill., corporation, has filed an application for permission to dredge sand and gravel for commercial purposes in the Long Island Sound, according to a notification received by town clerk William B. Trainer, secretary for the board of trustees of the town of Huntington, Long Island, N. Y., from Col. G. M. Hoffman, district engineer of the United States War Department, First District, New York City.

Colonel Hoffman advised the board of trustees that an application had been received from the company for a permit for work in the navigable waters of the United States, and that the notification is in line with the regulations of the War Department providing that the proper governing officials in the locality in which the proposed work is located shall be notified of applications of this nature in order that they may have full opportunity to be heard in case the contemplated work may possibly interfere with any plans or work which the authorities have in view and to submit protests from the standpoint of navigation. It is necessary for the protestants to give their specific reason for protesting.

The Village of Lloyd Harbor is interested as the site of the proposed dredging is in the Long Island Sound, about 2,600 ft. off shore from Lloyds Neck, which Neck is a part of the incorporated village.

Probably the most important point to be investigated is what damage the dredging in Long Island Sound, 2600 ft. from shore can do to the mainland of Lloyd Neck, if any. There seems to be a feeling that with the suction type dredge, as would probably be used in a proposition of this kind, there might be a possibility of dredging a very deep pit in taking out the sand and gravel and that the bottom for long distances on every side would, by the water's action, slide in the hole, and that eventually it might reach out to a point that would damage the shore line in the vicinity. It is also felt that it is a hard matter to control the activities of sand and gravel companies when once they receive a permit to operate. If, through competent advice, it is found that this is likely, a fight will be made against the application.

Notwithstanding the action taken by the municipalities, the wealthy residents of Lloyd Neck may fight the application of the company before the War Department, for on the Neck there are located the massive estate of Marshall Field, as well as the late William J. Matheson, and a number of others, who will probably not relish the sight of sand dredges immediately in front of their estates.

The fight to keep out the operations of sand and gravel companies along the north shore of Long Island, is an ever-increasing one, for while the civic interests are centered on the legal action of the incorporated village of Asharoken against the Metropolitan Sand and Gravel Co. to keep it from operating along the water front in defiance to the zoning law, and which will be heard in the Suffolk County Supreme Court this month, the O'Brien Brothers Sand and Gravel Corp. announced recently that it had quietly acquired the 100 acre summer estate of Mrs. Philip Curran at Belle Terre, Port Jefferson, and would soon tear down the house and other buildings necessary and make way for the construction of a large inland plant, which combined with its present plant and other holdings will make it the largest sand and gravel producer in the United States. The price for the property, it is understood, was $500,000, and the new proposed land plant will cost in the neighborhood of $700,000.

Many of the companies are limited to working under water in the harbor as the O'Brien Co. has been limited in the past, but soon the land excavating machinery will be installed and docks will be constructed on the waterfront for the loading of the inland sand and gravel on the barges.

It has since been learned that the dredges to be used on the work are what are called self-contained dredges. No scows are used, but the sand and gravel are pumped into the hold of the ship, the water running out again and leaving the other material in the boat. The boat then steams away for its delivery destination. The company guarantees there will be no smoke or noise, and the various civic organizations look upon this means of dredging gravel to supply the demand as the possible salvation of the hills along the north shore of Long Island.—*Huntington* (N. Y.) *Long Islander.*

Seattle Gravel Producer to Sell Concrete Reinforcing Steel

AT A COST in excess of $30,000 the Pioneer Sand and Gravel Co., Seattle, Wash., will construct a reinforcing steel bar plant building at 2501 Northlake avenue. The company is broadening its service to contractors and will hereafter represent the United States Steel Corp. in the state of Washington in the distribution of reinforcing bars. A stock of 3000 tons of bar steel will be carried at all times, company officials announced recently, and the most modern bending machinery will be installed in the new plant building to handle the reinforcing steel orders.

The structure will be steel frame and 162x72 ft. in area. Concrete floors are specified. The sides will be of corrugated iron and electric hoists operating on monorail will be employed in handling the steel. The roof will be of asbestos.

The new plant will be in operation by January 15. Construction will be handled by company crews of workmen.—*Seattle* (Wash.) *Journal of Commerce.*

New Iowa Gravel Plant Under Construction at Wallingford

IT HAS BEEN DEFINITELY DECIDED to build a spur from the main line of the Rock Island in Wallingford, Ia., to the new gravel plant of the Waterloo Concrete Materials Corp.

At the present time there is a crew of 30 men employed on the erection of the plant. The crew consists of concrete workers who are putting in the foundation for the rock crusher, and carpenters who are building the trestle for the conveyor belt, motor houses and the big building in which the gravel will be washed, graded and loaded on cars. The last named building will be 76 ft. in height. The trestle leading to it from the field hopper starts in the bottom of the pit and enters the building at a height of 60 ft. The trestle and the building are built of heavy timbers and bolted together in many places. On the trestles are located two small houses in which will be 35 hp. motors that will operate the conveyor belts.

There will be twelve electric motors, ranging from 15 to 125 hp. to furnish power for the entire plant. This is not considering the other motors and engines that will be used for digging and transporting the gravel to the washer.

As the gravel is taken out of the hopper on the conveyor, it travels for a short elevation and then drops into a 2½-in. scalping screen which lets all gravel below that size through and drops it on another belt that takes it to the washer and sizing screens where it goes through at least six different operations before it lands in one of the five bins, one for each size. Three of the bins are 33 ft. in height and two are 29 ft. The rest of the building will contain the numerous screens, cones, two double and one single Eagle washer and two picking tables, where all of the shale in the gravel will be picked out by hand. The gravel that is larger than 2½ in. will go in the two rock crushers. Wash water will be supplied by an 8-in. pipe. This pump will be run by a 60-hp. motor.

There will be a railroad track on the east and west side of the building and gravel will be loaded directly from the building to the cars.

The plant is drawing a lot of attention and will be interesting to watch when in operation. Actual cost is not known at this time but will be in the neighborhood of $200,000.—*Estherville* (Ia.) *Enterprise.*

Dredging Permit Asked

THE Warner Co., Philadelphia, Penn., has applied for a federal permit to dredge sand, gravel and cobbles for commercial purposes from the Delaware river, between Chester, Penn., and Trenton, N. J., at localities to be approved by the United States Engineer Office at Philadelphia.—*Wilmington* (Del.) *Every Evening.*

New York Railroads Agree to Eliminate 77 Grade Crossings

FOUR RAILROADS have agreed to place contracts between now and December 31, 1931, for the elimination of 77 grade crossings at an estimated expenditure of approximately $27,000,000, according to a statement issued December 9 by Acting Governor Herbert H. Lehman.

Of this amount, about $21,000,000 worth of contracts will be placed by the New York Central, Mr. Lehman said he was informed by C. C. Paulding, vice-president of the ralroad company, at a conference with representatives of many of the railroad companies.

James MacMartin, chief engineer of the Delaware & Hudson, submitted figures showing that his railroad will place contracts totaling about $5,000,000.

These agreements were made, Mr. Lehman said, regardless of and pending the decision of the courts on the Dunmore Act, which applies the eight-hour day and prevailing rate of wages laws to all grade-crossing elimination work.

The New York, New Haven & Hartford and the Erie, Mr. Lehman stated, were not willing to obligate themselves with regard to orders they may receive in the future; they did agree to proceed with the letting of contracts on such orders of the Public Service Commission as are already in their possession. These amount to about $600,000 for the New Haven and $200,000 for the Erie.

The other railroads represented at the conference, the statement said, declined to recede from the stand previously taken by them and insisted on awaiting the decision of the courts as to the constitutionality of the Dunmore Act before proceeding with additional contracts.

Electrical Resistance of Contact Between Nuts and Bolts

THE BUREAU OF STANDARDS, *Journal of Research*, has issued Research Paper No. 227, which gives the results of an investigation of the electrical conductivity of Dardelet threads and of American National coarse threads on ¾-in. bolts and nuts made from both ferrous and non-ferrous metals.

Wherever electric current passes through a threaded connection it is of great importance that the thread contacts be maintained constant under a substantial pressure so as to reduce electrical resistance and to insure uniform electric conductivity even under extreme vibration and shock.

Free reprints can be secured from the Dardelet Threadlock Corp., 120 Broadway, New York. The Superintendent of Documents, Washington, D. C., prices the reprints at 10 cents each.

Increase Shown in Number of Men Employed on Public Works

A GREAT INCREASE in employment is reported in the public works programs of the federal, state and municipal branches of the government throughout the entire country, according to reports received and made public December 12 by Col. Arthur Woods, chairman of the President's Committee for Employment.

A minimum of 200,000 more employes are engaged on public building projects this year than at the same time last year, it is estimated on the basis of reports received.

Mayors of 210 cities, replying to inquiries from the President's committee, reported that 11% more workers are employed now than at the same time a year ago. In November of 1930 a total of 248,784 workers were employed in public work construction. In November of 1929, the employes of the same cities numbered 224,698.

"Marked success has attended one of the principal efforts of the administration to increase employment in the field of public works," said Col. Woods. "The reports from mayors of these cities clearly reveal that mayors and city governments have patriotically co-operated in the effort to increase public building and construction projects. This was urged at the beginning of last winter by President Hoover, who pointed out that at a time when industrial employment was declining it seemed extremely important that as many as possible of the workers should find an opportunity to work in the field of public construction."

Stone Quarry in Bankruptcy

THE BROWNSTONE QUARRIES, owned by the Longmeadow Co., Inc., Long Meadow, Mass., was sold at public acution recently at the stone-cutting mill. Mayor Dwight R. Winter of Springfield was the auctioneer. The properties include the Worcester quarry, Pine Kibbe quarry and the stone cutting plant in Maple Street. The real estate was bought by a representative of the Springfield Chapin National Bank and Trust Co. for $22,500, subject to all taxes and other municipal assessments. John H. Madden purchased the machine and tools for $5000. All classes of local citizens are interested in the sale. The properties constitute the only industry of the town.—*Springfield* (Mass.) *Union.*

Dredging Permit Asked

THE Delaware River Sand Dredging Co. of Bordentown, N. Y., has applied for a federal permit to dredge sand, gravel and cobbles for commercial purposes from the Delaware river, in front of its property at Riverside, and shoreward of the established pierhead and bulkhead line.—*Bordentown* (N. J.) *Register.*

Humboldt Gravel and Tile Co., Iowa, Sold

L. S. CASS, Waterloo capitalist, who completed business transactions in July for the gravel interests in the Humboldt Gravel and Tile Co., Humboldt, Iowa, took possession December 1, and then in turn leased the gravel works to Concrete Materials Corp., of which he is the principal stockholder.

The new corporation operates a number of plants over Iowa, located at Estherville, Waterloo, Eddyville, Clarksville and the new one at Humboldt beside one at Bethany, Mo. George K. McCollough, who has been the sole owner of the Humboldt Gravel and Tile Co. since 1925, has been named the assistant general manager of the Concrete Materials Corp., and will overlook all the plants of the corporation.

George E. Sinning of Humboldt will be superintendent of the local plant. Coming to Humboldt in 1928 from the Northwestern Gravel Co. in Lake View, he has been connected for the past two years with the local plant, and has now been named superintendent here under the new corporation.

The new management has made no changes in the operation of the plant, and the work is running as previously with the exception of the new name under which the company operates. The work will continue for the present as it has in the past. The first contract that the new corporation has made is to furnish and haul the gravel for the bridges and culverts on Highway No. 169 south of Humboldt. At present four trucks are working on this job. Gravel is also being furnished for the bridges and culverts on Highway No. 15 near Ames.

The local gravel works has an output of 800,000 tons per year. It has been awarded many of the largest contracts in this part of the state. During the past months gravel for the paving in Webster county was secured from the Humboldt plant, and many bids will be made in the future for paving contracts.

The gravel business here has been organized for fifteen years, and for the past five years has been owned by George McCollough, who originally bought out the Rogers' stock in 1922. At that time there were three stockholders, W. J. Welp, J. H. Welp and Floyd Goodrich. Later the Messrs. Welps sold out their shares and Messrs. Goodrich and McCollough were left partnership. December 1, 1925, Mr. McCollough bought out Mr. Goodrich and was left in control.

Few changes will be made in the gravel business at present. No new men will be stationed at Humboldt according to present plans, and the only changes will be the transferring of ownership from George McCollough to L. E. Cass. Mr. Cass lives in Waterloo, and although he will visit Humboldt frequently, he will continue to make Waterloo his home.—*Humboldt* (Ia.) *Republican.*

Foreign Abstracts and Patent Review

Progress in Cement Research. Dr. C. R. Platzmann reviews the progress that has been made in cement research in 1929. Cement investigators have devoted themselves in a striking manner to problems of moduli and the graphic presentation of components. H. Lafuma dealt in a consideration of the hydraulic modulus primarily with $\frac{SiO_2+0.2Al_2O_3}{CaO}$ as the modulus of hardening, whereas he claims Vicat's modulus $\frac{SiO_2+Al_2O_3}{CaO}$ preferably to be a chemical modulus. The very industrious S. Nagai was engaged in the establishing of new modulus values. He determined first of all the lime-silicic acid relation with—

$$l = \frac{CaO-(1.65Al_2O_3+0.7\,Fe_2O_3+0.7SO_3+\text{free lime})}{SiO_2-(0.8\cdot\text{insoluble residue})}$$

from which resulted a molar relation of $m = 1.07 \cdot l$. Then the molecular relation of $3CaO{\cdot}SiO_2$ to $2CaO \cdot SiO_2$ is equal to $\frac{m-2.00}{3.00-m}$. E. Jaenecke investigated the best composition of the portland cement clinker and arrived at the following formulas:

$$\frac{Al_2O_3}{31}+\frac{SiO_2}{35}+\frac{Fe_2O_3}{59}=0.95,$$

$$CaO = 95 - Al_2O_3 - SiO_2 - Fe_2O_3$$

In contrast, H. Kuehl established the following formula under the assumption that X kg. limestone applies to 1 kg. of clay:

$$X = \frac{2.8\,SiO_2+1.1\,Al_2O_3+0.7\,Fe_2O_3-CaO\ (\text{for clay})}{2.8\,SiO_2+1.1\,Al_2O_3+0.7\,Fe_2O_3-CaO\ (\text{for limestone})}$$

In reference to the graphic presentation of cement components there was obviously a tendency to employ the four component system. H. Kuehl and H. Lorenze, in dealing with the fixing of the lime by the constituents of the clay under progressive heating of raw cement flour found that one-half of the lime is fixed by clay when the last portions of CO_2 are leaving, and that the clinker minerals build up in the direction of the low in lime to the high in lime content. The dicalcium silicate appears between 1000 and 1250 deg. C. Alit represents a mixture of $3CaO\text{-}SiO_2$ with Jaeneckeit; and Celit is claimed to be a mixture of dicalcium ferrite and $2CaO{\cdot}Al_2O_3$. These results were confirmed in tests by W. Schriewer and C. Pruessing according to whom the greater portion of CaO is fixed with SiO_2 and Al_2O_3 before the end of the calcining process. The second state of fixing of the lime occurs between 1100 and 1300 deg. C.

A number of contributions dealt with the problems of constitution and hydration. According to E. Jaenecke, the tricalcium-silicate consists of CaO and $\beta 2CaO{\cdot}SiO_2$, whereas the Alit represents mixed crystals of $2CaO{\cdot}SiO_2$ and $8CaO{\cdot}Al_2O_3{\cdot}2SiO_2$. In dealing with the part of manganese in cement clinker, A. Guttmann and F. Gille found that the manganese is fixed as manganic oxide and this is able to take the place of Fe_2O_3; upon the basis of their experimental data, they concluded that Celit, for example, can have the following formula:

$$4CaO{\cdot}Al_2O_3{\cdot}0.6Mn_2{\cdot}O_3{\cdot}0.4Fe_2O_3+CaO{\cdot}Al_2O_3$$

The synthesis of calcium aluminates and their hydration have been dealt with experimentally in a series of articles by S. Nagai and R. Naito, in which the formation of the aluminates was measured at different temperatures, with the following results:

	$CaO{\cdot}Al_2O_3$ deg. C.	$5CaO{\cdot}3Al_2O_3$ deg. C.	$3CaO{\cdot}5Al_2O_3$ deg. C.
Quantitatively at	1250	1250	.....
Sinter temperature	1500	1400	.....
Fusion point	1600	1450	1720

Special interest was given, as before, to the alumina cement. Feret traced the decreases in strength solely to the water content, whereas A. F. Roscher-Lund regarded the sensitivity of the alumina cement to drying out as the cause of disturbance in setting. H. W. Gonnell determined in X-rayographic studies that the sanding off of alumina cement is based upon the formation of $CaCO_3$ by carbonic acid from the air. C. R. Platzmann reviews also analytical and testing methods, problems of standard specifications, properties and influences of cement, operation and new cement plants.—*Zement* (1930) **19,** 31, pp. 722-724; 36, pp. 843-847.

German Report on Aggregates. Otto Graf presented a paper on the selection and purchase of sand and gravel for concrete, and particularly for reinforced concrete, at the general meeting of the German Association of Sand and Gravel Producers. He dealt primarily with the gradation of sand and gravels and the effect of gradation and of proportioning of the sand and gravel upon the strengths of various concretes. In the last part of his paper he presents the specification charts of the Detroit Engineering Society for both sand and gravel, in which only high grade aggregates are admitted. Such codes are perhaps applicable only locally in America, but cannot be effective in Germany, he concludes. Therefore for German requirements only those specifications can be drawn upon that are used or have been recommended generally in the United States.

A table of the United States grading requirements is given, and also charts of the American specifications for gravels and sands. The sand specified for the United States as a whole is more closely limited in gradation than the material considered suitable for reinforced concrete work in Germany. The American specifications for gravel are even stricter. This fact is important—that the American Concrete Institute demands in its code of 1928 that the aggregate composed of sand and gravel must contain at least one-third and not more than two-thirds gravel in the case of reinforced concrete. The Germans have less strict specifications for sand and also for gravel, requiring a minimum of one-fifth and a maximum of three-fifths of gravel in reinforced concrete. Samples have been taken from deliveries of German aggregates, and gradation charts prepared. The variations in the charts indicate what must be done to obtain a better concrete according to American standards.—*Tonindustrie-Zeitung* (1930) **54,** nos. 71, 72, 74.

Operating Method and Efficiency of Air Separators. P. Rosin and E. Rammler present the second part of their theoretical investigations of the operating method and efficiency of air separators as applied to the preparation of pulverized coal.—*Zement* (1930), **19,** Nos. 42, 43, 44, 45.

Free Lime, Soundness and Strength. Upon the basis of experiments on clinker of varying chemical composition and burned under varying conditions, A. Guttmann and F. Gille can confirm the statements of Haegermann concerning the numerical connection between the free lime content of the cement and its behavior in the cold water and also in the boiling test (*Zement*, No. 42, 1930). Reference may be made to Wm. Lerch, who in his very thorough studies on the action of free lime upon the soundness came to the conclusion that cements with a content of less than 1% free lime may be considered in general as sound, whereas in presence of more than 3% free lime unsoundness appears usually in the pat. A. Guttmann adds this conclusion, that for a content of as much as 4% of free lime in the clinker an addition of about 30% slag sand improves its behavior in the soundness test considerably.

In reference to strength, a higher content of free lime *besides* much alit ($3CaO{\cdot}SiO_2$) acts to disturb its development, especially upon after-hardening, whereas in the presence of greater quantities of belit ($2CaO{\cdot}SiO_2$) it can further the after-hardening. In order to explain this, it is assumed that the

belit is excited to hardening by the free lime similarly as an exciting of the basic silicates and aluminates by the granulated additive slag to the clinker is assumed. The alit, however, requires no excitation for its hardening by the free lime, but splits off hydrate of lime itself when combined with water. But since the slaking of the free lime and the hydration of the alit cannot take place simultaneously, these processes disturb each other reciprocally.

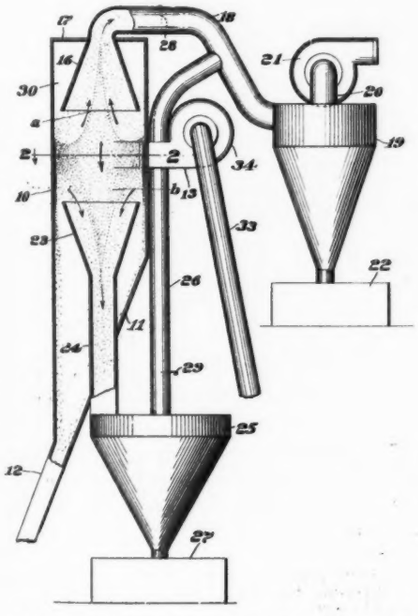
From this can be deducted the frequently considered practical conclusion that in the adjustment of the raw flour to a high modulus of lime for the purpose of forming much alit, care must be taken for the fine pulverization of the raw materials and for a complete burn, since otherwise the intended increase in strength is prevented by the appearance of much free lime *besides* the alit. —*Zement* (1930), **19**, 46, p. 1078.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Air Classification. In separating fine and coarse grains by centrifugal force it is claimed by the inventor of the device shown that fine particles settle with the coarse because they are out of the suction of the air discharge by which the greater part of the fines are lifted. The purpose of his device is to catch these fine settling grains.

In the form shown the device is a vertical cylinder with a bottom discharge for the coarse particles. The feed is admitted about half way down the cylinder with air under pressure. This causes a whirl by which the coarser grains are thrown to the side wall of the cylinder. They slide down this to the discharge outlet.



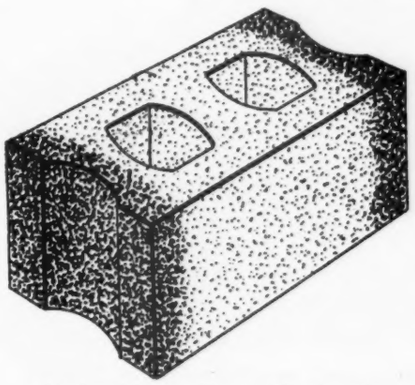
Air classifier for separating fine and coarse grains

That part of the fines which is not lifted to the air discharge settles in the center of the cylinder. A funnel is placed to catch these fines and a pipe below connects with a conical receptacle. The fines that go up to the air outlet are caught in an ordinary cyclone.

The funnel which catches the settling fines has to be of just the right diameter if it is to catch only the required fines and none of the coarser grains.

The fines caught in this way may be discharged as a separate product or they may be added to the fines caught in the cyclone connected to the air outlet. A simple way of mixing the fines is shown, the lower receptacle being connected to the cyclone inlet by a pipe.—*Albert H. Stebbins, U. S. Patent No.* 1,756,960.

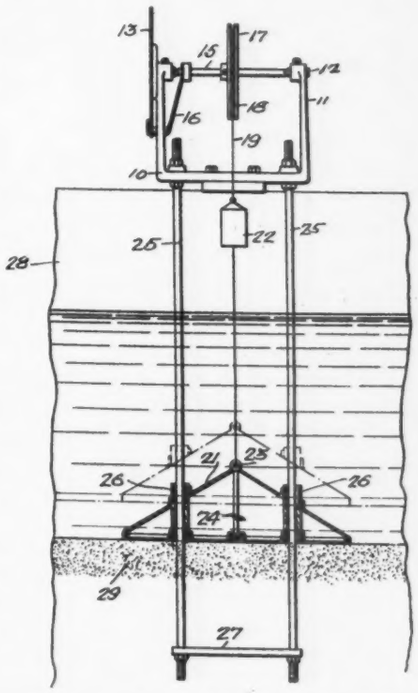
Cinder Building Block. The invention relates to an improved cinder block. The object in view is to provide a block in which the wall surface at one side is denser or more compact than the other, so that such dense wall will have a more compact consistency, improved appearance, and may be exposed to the weather for resistance and durability. The other side, being less dense and more porous, will retain the desirable characteristics of a porous wall. The inventor utilizes a series of tamps that are of variable weight in conjunction with a vibrating wall plate, thus varying the cement-cinder ratios. *Francis J. Straub. U. S. Patent No.* 1,766,561.



Cinder block of variable density

Metering Sand Depth. It is often necessary to know the depth of sand in a tank or classifier and if the water is muddy the usual way to find it is by sounding with a stick. A metering device has been invented which obviates the necessity of sounding by showing the depth of sand on a dial. The pointer on the dial is attached to a shaft which carries a pulley. A cord which passes over the pulley has a counterweight at one end and a float at the other. The float is of such weight and volume that its specific gravity is greater than that of water but less than that of sand saturated with water. Hence as the tank is filled with sand the float remains on top of the sand and rises and falls as the sand rises and falls.

The device was invented for use in washing out filter beds. The sand in these packs down with use. They are washed by admitting a current of water from below which raises the dirt and also loosens the sand grains so that the bulk of sand is greater. By watching the rise of the sand it may be ascertained that the washing is complete. But there would seem to be no reason why a device of this kind could not be applied to many settling and classifying devices. It would be especially useful in operating some forms of classifiers.—*F. W. Herring, U. S. Patent No.* 1,770,308.



Metering device for ascertaining the depth of sand in a classifier

Oil Flotation of Florida Phosphates. The invention relates to the concentration of phosphate-bearing material as applied in the Florida phosphate fields. The author states that in one test on material from the No. 11 mine of the International Agricultural Corp. at Mulberry, Fla., a 23% bone phosphate of lime material was concentrated to 68.8% bone phosphate of lime with an extraction of 85.7% of the bone phosphate of lime in the crude material. He used 2.5 lb. per ton of a soap made by mixing equimolecular proportions of the alkylamine, known as diethylamine $(C_2H_5)2NH$, and oleic acid. It was added to the pulp in a 5% solution. There was added 4 lb. per ton of a liquid immiscible in water, such as fuel oil. Triethylamine also produced a satisfactory concentrate. Other less satisfactory reagents are described in the patent. *William Trotter and Altoft W. Wilkinson,* assignors to Minerals Separation North American Corp. *U. S. Patent No.* 1,761,546.

Rockland and Rockport Lime Corp. Curtails Operations

THE ROCKLAND AND ROCKPORT LIME CORP., Rockland, Me., announced recently the closing of operations at the Ulmer quarries and the Northend gas kilns.

President George B. Wood makes the following statement with regard to business conditions and the reasons for closing the lime kilns in Rockland this winter:

"Due to unusually adverse business conditions, the Rockland and Rockport Lime Corp. has been operating at a loss for the greater part of the past year. No improvement in business can be expected before the spring of 1931. The lime industry of Rockland depends greatly upon the shipment of building lime to New York City. Under normal conditions, the low cost of direct water transportation is a distinct advantage over competitive transportation costs. Under the present conditions, with lack of residential building construction and small demand for lime, the consumer in New York no longer desires lime in large delivery lots by water transportation. Water shipments must be warehoused and redelivered by automobile trucks. The total cost of such delivery is greater than competitors' delivery cost all rail to New York destinations.

"Various lime producers with plants in Massachusetts and Connecticut enjoy preferential low rail rates, which include free lighterage delivery of single car lots to principal points in New York and Brooklyn. No such comparative rail rates from Rockland are available. The Maine Central Railroad has been requested to establish similar special rail rates from Rockland to New York, but such request has been met with refusal.

"The Rockland and Rockport Lime Corp. owns a modern lime plant at Adams, Mass., strategically located and favored with a preferential low freight rate to New York City. This low rate is made expressly to meet normal water competition from Rockland.

"Under the circumstances it becomes necessary, as a matter of economic business policy, to discontinue the operation of two plants at greatly reduced capacity. The lime kilns at Rockland are being closed and lime for all markets will be produced at the one plant in Massachusetts operating at full capacity.

"With the return of better business conditions, operation of the Rockland plant will be resumed. It is hoped that this will be possible by early spring.

"Operations for the production of limestone will be continued throughout the winter at the new Cedar street quarry and at the rock crushing plant. Temporarily two of the smaller lime kilns will be kept in production, and the Lime Rock Railroad will operate on a reduced schedule."—*Rockland* (Me.) *Courier-Gazette.*

Sewell Lime Co., Orofino, Ida., Holds Annual Meeting

A MEETING of the stockholders of the Sewell Lime Co. was called by President H. D. Britan at the office of the company recently for the purpose of electing two additional directors. Frank A. Jones and Charles O. Portfors were elected, making the board seven members. The board was also authorized to add two additional directors whenever they so desired.

Over 20 stockholders were present. The report of the secretary was read giving a history of the project from the time of the discovery of their immense deposit at Lime mountain; the amount of development done; the unusual high grade of the lime which was tested in actual practice on the coast; and right here at home; at the Northern Idaho sanitarium, and in the Orofino Creamery building which is now under construction; and of the surprising demand already created in a commercial way; of the loyal support of our local people; the culmination of all which, engendered a spirit of felicitation, good will and co-operation, far surpassing the highest expectations of the men responsible for the development of this new industry, which will mean so much for the welfare of the people of this community.

The development of this new industry to its present status; the employment of eight to twelve men since inception of work last March; and the fact that this is the only new industry started and functioning in this territory since the Wall Street crash, speaks for itself in the management of the affairs of the Sewell Lime Co.—*Orofino* (Ida.) *Tribune.*

Montana Lime Man Heads New British Columbia Company

D. R. PETRIE, former Missoula, Mont., man, is head of the Petrie Lime Products, Ltd., organized on Texada Island, B. C., according to information received in Missoula. He formerly was connected with the Petrie Tractor and Equipment Co., of Missoula.

Mr. Petrie recently completed the sale of his interest in the Missoula corporation to Roy Robinson and William Gallagher and went to British Columbia, where he organized the new company. The capitalization of the Petrie Lime Products, Ltd., is $50,000. The business will be the manufacture of quick limes, chemical limes, hydrated lime and raw lime rock products. In this new venture Mr. Petrie and his associates are taking over the entire property and equipment of the Western Lime Products, Inc., of Seattle. The offices will be located in Seattle, Vancouver, B. C., and at the plant on Texada Island.

Mr. Petrie's partners are both former Montanans. S. W. Gebo, vice-president and managing director, is well known in Missoula, Central Montana and Wyoming, where he has been associated with the coal mining industry for years. L. H. Drake, the secretary-treasurer, was a merchant in Billings for 15 years.—*Missoula* (Mont.) *Missoulian.*

Shipments of Sand-Lime Brick in November for U. S. and Canada

THE following data are compiled from reports received direct from 20 producers of sand-lime brick located in various parts of the United States and Canada. The number of plants reporting is the same as those furnishing statistics for the October estimate, published in the November 22 issue. The statistics below may be regarded as representative of the entire industry in the United States and Canada.

Reports received for the month of November seem to indicate that production and stocks on hand in the sand-lime brick industry remain about the same, as do shipments by rail. Shipments by truck, however, decreased somewhat, while an increase is shown in unfilled orders.

Average Prices for November

Shipping point	Plant price	Delivered
Atlantic City, N. J.	$11.00	$15.00
Detroit, Mich.	13.00	15.50
*Grand Rapids, Mich.	14.00	14.00
Iona, N. J.	11.00	14.00
Jackson, Mich.	13.00	.....
Milwaukee, Wis.	9.50	12.00
Minneapolis, Minn.	10.00	.....
Mishawaka, Ind.	11.00	.....
Pontiac, Mich.	11.00	13.00
Saginaw, Mich.	12.00	.....
Sioux Falls, S. Dak.	12.00	14.00
Syracuse, N. Y.	18.00	20.00
Toronto, Can.	11.00	13.00
Winchester, Mass.	.....	12.50

*Less 5% 10 days.

The following statistics are compiled from data received direct from 20 producers of sand-lime brick in the United States and Canada:

Statistics for October and November

	*October	‡November
Production	7,924,915	7,126,478
Shipments (rail)	3,437,000	3,044,388
Shipments (truck)	6,168,967	4,659,236
Stocks	12,260,149	12,729,954
Unfilled orders	7,567,000	8,183,000

Notes from Producers

Flint Sandstone Brick Co., Flint, Mich., reports that it has one order for a million brick, to be delivered by spring.

The executive committee of the Sand-Lime Brick Association has selected Atlanta, Ga., as the meeting place for the convention on February 3, 4 and 5, 1931.

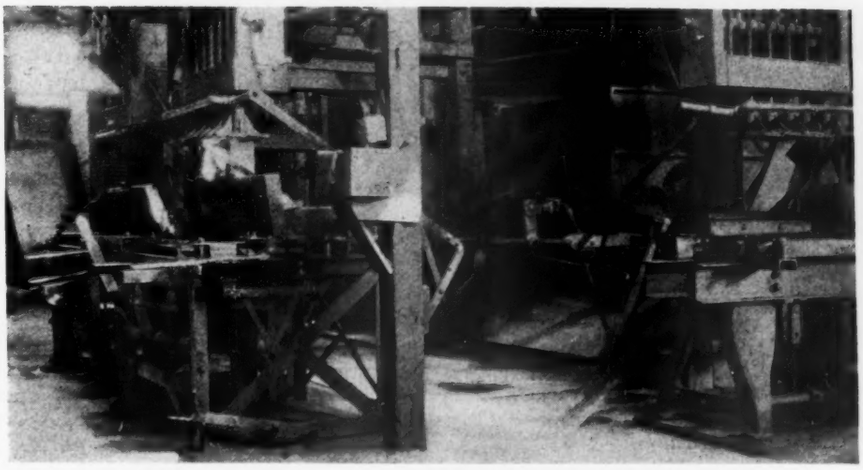
*Twenty plants reporting. Incomplete, one plant not reporting production and seven not reporting unfilled orders.

†Twenty plants reporting. Incomplete, one plant not reporting production, one not reporting stocks on hand, and eight not reporting unfilled orders.

Cement Products

Making Silo and Corn Crib Staves

Concern at Waterloo, Iowa, Headed by Floyd Goodrich, Also Makes Burial Vaults



Machine layout for making silo and corn crib units

THE Waterloo Concrete Corp., Waterloo, Iowa, is specializing in silos and corn cribs, for which it is doing the erection as well as making the units. Incidentally, it also has a department for the manufacture of concrete burial vaults, for which it finds a reasonably steady market.

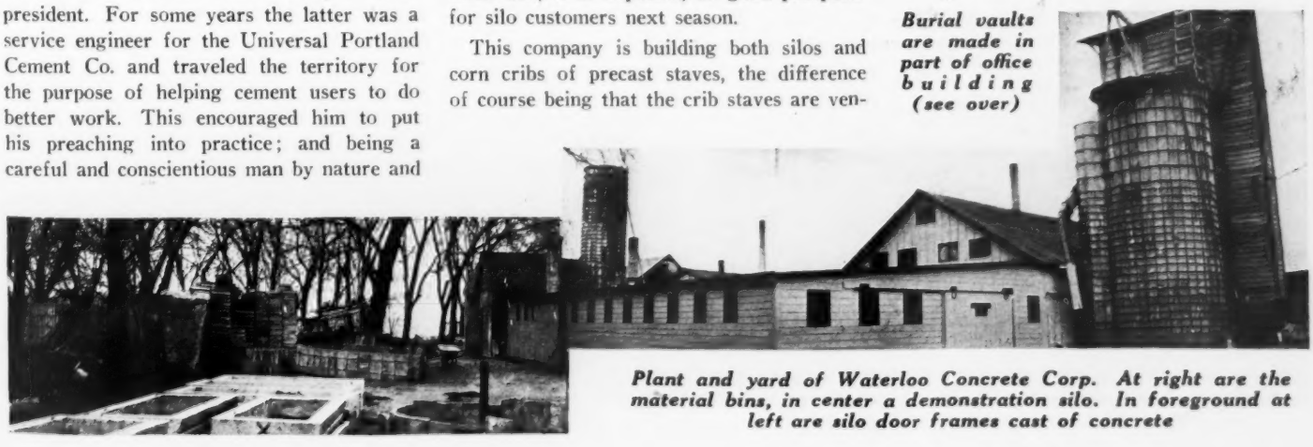
Floyd Goodrich, for many years in the production of building materials in Iowa, is president of the company, and C. L. Douthett, who is well known in concrete circles in Iowa and thereabouts, is vice-president. For some years the latter was a service engineer for the Universal Portland Cement Co. and traveled the territory for the purpose of helping cement users to do better work. This encouraged him to put his preaching into practice; and being a careful and conscientious man by nature and by training, as well as having a reputation to maintain, he is trying to make the kind of products which he advocated in his former capacity.

This has not been a silo year throughout the central states so far as actual sales are concerned. But the drought has taught many people the value of a silo as a means for salvaging a poor crop, and many makeshift structures have been thrown together for temporary use. The farmers who are using these will, it is expected, be good prospects for silo customers next season.

This company is building both silos and corn cribs of precast staves, the difference of course being that the crib staves are ventiated. The staves are made on New Monarch machines with tampers. They are 30 in. long, 10 in. wide and 2½ in. thick, concave on one edge and convex on the other, thus forming an interlock. They are made with straight horizontal ends, and staggered joints are used in construction of the silo, in order to secure the necessary stability.

The staves are made by the dry tamp process, employing three separate machines each making one stave at an operation.

Burial vaults are made in part of office building *(see over)*



Plant and yard of Waterloo Concrete Corp. At right are the material bins, in center a demonstration silo. In foreground at left are silo door frames cast of concrete

Office of Waterloo Concrete Corp. and part of silo stave storage yard

These machines are grouped around three sides of a square, the operator standing on the outside of the square, with the material furnished to all machines from the inside of the square. Each machine is equipped with an Anchor automatic tamper, with tamping feet specially designed for this class of work. The staves are made on wood pallets and are removed to the curing room by a car and track system.

Materials are proportioned by weight in a batch hopper standing on the platform of a Fairbanks scale. The sand and gravel are drawn from chutes just back of the stave machines, close to where the Ideal mixer is located. The materials are secured from a local producer and are delivered by track hopper and belt conveyor to the storage bin.

Silo door frames are also made of concrete, each in one reinforced section. These are made with a beveled recess for holding the door, so that as the silage presses against it from the inside it is crowded tightly into its seating and excludes all air.

The plant also has a shop where the doors are made, and another one for fabricating reinforcing, making hoops for the finished structures, making metal steps to be inserted in the hoops for forming a ladder, and other accessories in connection with the work of erection. This part of the plant operates during the winter, thus giving work to a crew of men and making it possible for the company to maintain continuous work for some of its employes.

Company Also Erects Structures

The company is not in business simply to make and sell building units, but finished structures. Occasionally a few corn crib staves and accessories have been sold to individuals who wanted to do their own erection, but silo material is never sold that way. The company feels that it must keep a close control of the finished structure as well as of the component parts, and feels that an experienced crew of men, under its own supervision, can do a much better job than the ordinary contractor, and surely better than anything that be done by untrained farm labor. An erection crew consists of a foreman and three or four helpers, who are supplied with a truck for carrying staging and other erection equipment.

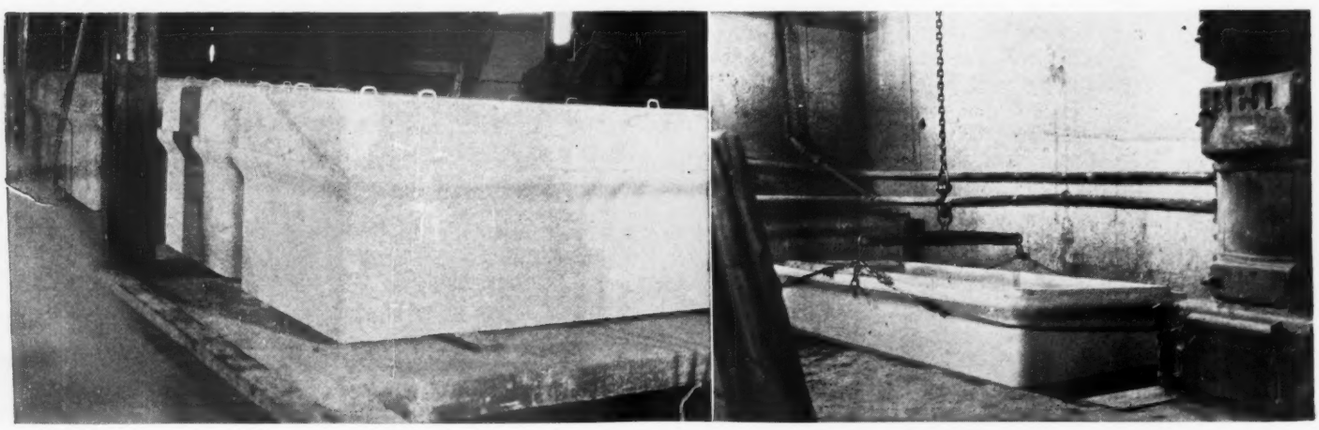
The company has developed a concrete roof which it is using on its silos unless some other type is preferred by the customer. It consists of a steel frame to which is attached ribbed metal lath, on which concrete plaster is placed. The top is troweled to a smooth finish and given a cement wash.

The inside of a silo is given a waterproof coating, and after this is put on and the structure is completed, the job is given an inspection by a competent inspector before it is formally turned over to the customer.

The corn cribs are made in various sizes and types to meet the wishes of the customer. A familiar type is patterned after the old wooden crib of the farm of better class, consisting of two sections with a driveway between. With this is also frequently combined a granary section above the driveway, built of tight silo units.

The manufacture of concrete burial vaults occupies the basement and first floor of the office building, where production can be maintained throughout the year. The manufacture of the vaults is carried on in the basement while the first floor is used as a stock room.

The vault forms are set up on vibrator tables, one for the body of vault and one for the cover, and after the forms are filled a hard and dense concrete is secured by the vibrating process. The curing is done under wet burlap. A tank is built just below the level of the floor, and kept supplied with water, and each vault is held suspended in this tank for a long enough period to determine its resistance to water. Directly above the tank is the hatchway to the floor above and the vault, after passing the water test, is taken up by a Yale chain hoist and given its surface finish.



Each vault is tested in a tank of water before being taken to stock room

Lindsay, Calif., Concrete Pipe Plant Makes Improvements

MACHINERY has replaced much of the hand labor in the making of concrete pipe at the P. M. Porter plant at Lindsay, Calif., a recent installation being a new feeder that supplies the mixture to the pipe-molds in the place of the former shoveling by hand.

To supply the feeder, two large bunkers have been erected above the shed housing the machinery. A conveyor belt carries rock to the one and sand to the other. These feed the mixer by gravity, and the mixer dumps on to a steel conveyor that carries the concrete up to the machine that feeds it into the shell in which the pipe is formed. The whole thing is housed in a new shed, machinery, housing and all costing in the neighborhood of $3500.

Rock and sand are taken from railroad cars at present and dumped into a concrete pit from which the conveyor belt lifts them. Mr. Porter expects, however, to be using gravel from the pit near the lime plant, east of Lindsay, soon. This plant will be ready for operation within a short time, it is said, and will furnish gravel screened to size for all concrete work. The gravel for the Porter yard will be brought in trucks from the pit and dumped into the small pit at the yard.—*Lindsay* (Calif.) *Gazette.*

Iowa Cement Products Plant Changes Hands

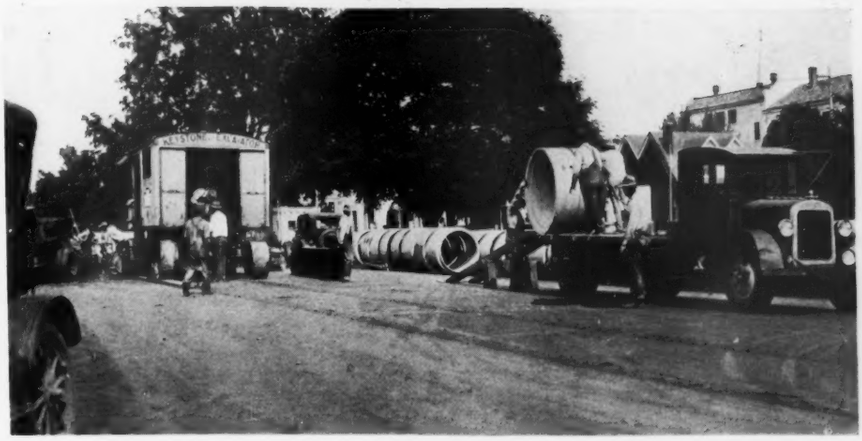
A. P. NELSON of the Spencer Cement Products Co., Spencer, Iowa, has bought several carloads of the machinery of the Cement Products Co. of Mason City, Iowa, which shut down four years ago.

The Mason City company was one of those in which Jack Hammond and J. J. Radford, now in California, were interested, the other three being at Spencer, Sac City and Lanesboro.

At one time Mr. Nelson is said to have had the largest drain tile works in the world. Tile of all sizes up to where half a dozen constituted a truck load were made here in the days when farms were being tiled in all the midwestern states. Mr. Nelson still makes tile but has added cement blocks of various kinds, and his output will be doubled with the machinery brought from the Mason City plant. When the tiling and building boom collapsed Mr. Nelson with the families of his workmen moved to Chicago, where they did cement work of all kinds on contract, returning home about a year ago.

Work continues at the tile plant practically the year around.—*Missouri Valley* (Iowa) *Times.*

Many products manufacturers are planning to continue work through the winter, at least sufficient to hold their best men with them.

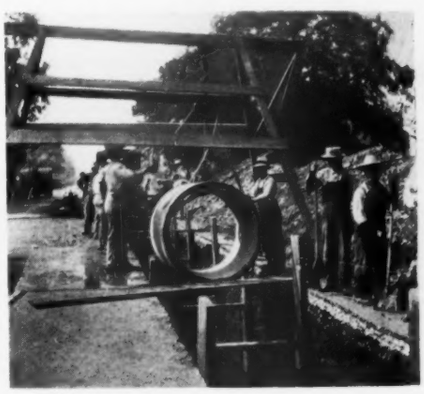


Concrete sewer pipe being delivered along trenches at Salem, Ore.

Oregon Gravel Co. Makes Concrete Sewer Pipe

THE Oregon Gravel Co., Salem, Ore., recently manufactured for the city of Salem a considerable amount of reinforced concrete sewer pipe. The engineering department of the city laid the sewer with its own labor force. It is 1½ miles long, extending from Union street south to the southern city limits, and serving one of the newer residence sections of the city of Salem.

Of this new sewer, 3309 ft. was of 48-in. pipe sections with 5-in. wall. The rest



Handling 48-in. pipe

of the sewer, except 500 ft., was of 42-in. pipe sections.

The intervening 500 ft. was built monolithic, although it was rather small in cross-section for this form of construction, being only 42 in. dia. The reason for the monolithic construction was that it traversed low ground where the sewer line came up to the base line of the pavement. To fit this condition the top of the monolithic section was made flat instead of arched, and suitably reinforced, and the pavement above it will be so constructed as to distribute the load and give the pipe additional protection.

Pipe sections of similar design could of course have been manufactured in special molds, and this method would no doubt have been adopted if the amount had been sufficient to justify it, as on a section of sewer of any considerable length the financial advantage would seem to be in favor of the shop-made product.

The depth of trench for the laying of the pipe sections ranged from 4 to 16 ft., the strength of the pipe for the various depths being regulated by the amount of reinforcing.

The pipe were made on Tuerck-McKenzie pipe machines. A 1:2:4 mix was used, with 1-in. gravel as the coarse aggregate.

Colton, Calif., to Have New Concrete Products Plant

WORK WILL COMMENCE about December 1 on the construction at the M. O. Hert property, immediately south of Colton, Calif., city limits, of a $50,000 plant for the manufacture of cement products, according to announcement made by Mr. Hert who has been responsible for the interesting of outside capital in the location.

The plant will be for the manufacture of cement pipe, posts, vaults, urns and landscaping ornamental fixtures, and will conduct a cement contracting business, and the selected location was chosen, it is pointed out, because of the accessibility of the property to both rail and highway transportation and the superiority of the raw materials available here.

The new plant, according to Mr. Hert, will be ready for operation shortly after the first of the new year, and will have its offices and headquarters in Colton.—*Colton* (Calif.) *Courier.*

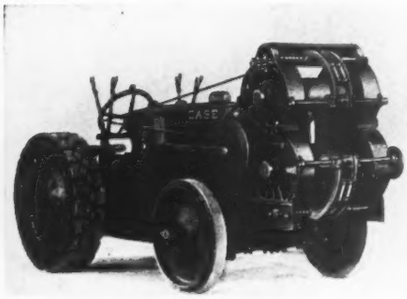
Will Make Haydite Block

ROBERT J. CLARK, Hinckley, Ill., cement products manufacturer, has secured the agency for the Western Haydite concrete blocks for the southern part of DeKalb county and a part of Lee county. Mr. Clark expects to have installed much new machinery by the first of March.

New Machinery and Equipment

Portable Hoist for Mounting on Industrial Tractor

THE TRACKSON CO., Milwaukee, Wis., has brought out a portable hoist in a new model known as the "HC," which is adapted to mounting on the Case Model CI industrial tractor.



New model portable hoist

Together, it is claimed, they provide an unusually efficient and sturdy hoisting unit that is especially suited to such jobs as handling concrete and other building materials, lifting heavy machinery, dragline excavating and other similar work.

Many improvements and additions have been made in the Model "HC" hoist, and among those mentioned are the following: over-sized drum shafts, stronger frames, improved clutches and the Trackson "level wind" which prevents the cable from criss-crossing and bunching up. All moving parts are shielded, and operation is simple, with all the controls in easy reach of the operator.

The Model "HC" hoist can be obtained either as a single- or as a double-drum unit, and either can be readily converted into the other type by merely mounting or detaching the upper drum. Owners of the single drum unit can easily add the upper drum and thus make their hoists suited to all work where a haul-back line is necessary.

It is maintained that the patented level wind (fairlead), an exclusive Trackson feature, greatly reduces wear and tear on the cable because it eliminates bunching up, kinking and tangling as the cable is wrapped on the drum, and winds evenly and smoothly at all speeds, and handling different size cables. Working with this device, state the manufacturers, is an anti-back-lash which maintains proper tension and keeps the cable securely wrapped, even when the line ahead goes slack.

Tandem Type Air Compressors

PENNSYLVANIA PUMP and Compressor Co., Easton, Penn., is marketing a new line of power-driven (Class 14-A) and steam driven (Class 15-A) two-stage tandem type air compressors suitable for pressures up to 250 lb. per sq. in.

The feature of this compressor, state the manufacturers, is that the high pressure cylinder is single-acting, instead of double-acting, as in standard construction, the high pressure cylinder being attached directly to the low pressure cylinder without any distance between the two cylinders. A plunger at the end of the piston acts as the piston for the high pressure cylinder and compresses air in this cylinder at only one stroke of the piston rod.

The new line of compressors was designed with the purpose of providing a compressor which, within the range of its capacity, would meet all the requirements of two-stage tandem service and which at the same time would be more economical of space than the standard two-stage tandem type.

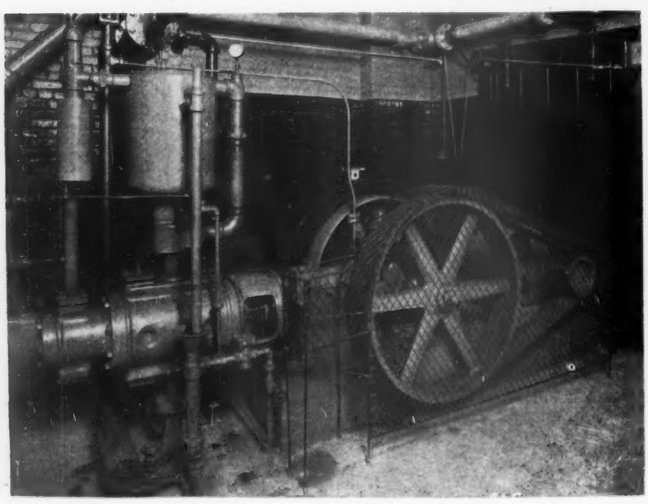
New Machine for Automatic Weighing of Bulk Cement

THE AUTOMATIC WEIGHER illustrated here is being manufactured by the Richardson Scale Co., Clifton, N. J. It is of the automatic hopper-dumping and self-registering type, and automatic conveyor type scales are available where needed.

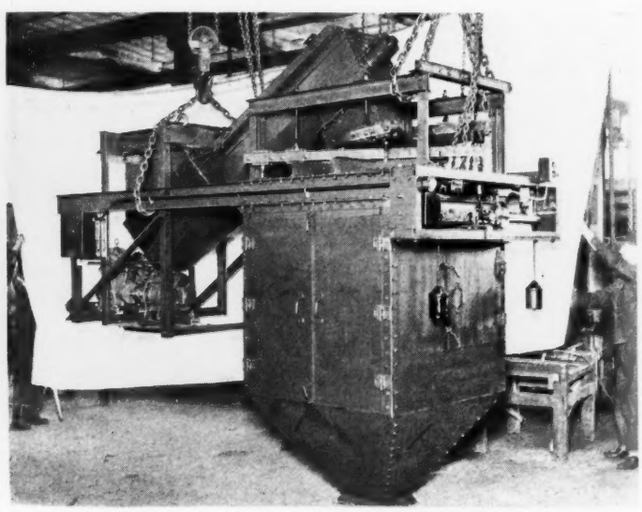
According to the manufacturer, the bad effects of a "flood" from the bin are eliminated by the double-screw feeder, which is an integral part of the scale. By double-screw feeder it is meant that there are two conveyors—one a large one to feed the main part of each weighing and a small one to feed the final "make weight."

The main screw conveyor is of ample size and speed for quick feeding. Inclined at a considerable angle from the horizontal, this conveyor takes the "run" out of the cement and delivers it quietly and under control through a dustproof chute into the weighing hopper which is also enclosed in a dustproof housing having suitable access doors.

The main screw feeder is driven by motor through an enclosed worm-speed reducer, which in turn drives a pair of heavy, cast, bevel gears that drive the conveyor through a slip clutch. When the main screw feeder has delivered approximately 90% of the individual weighing or batch, it is stopped by the action of an electric switch in the control box. The small auxiliary screw is mounted immediately underneath the main feeder and feeds in what is known as the "dribble stream" or final small flow neces-



Class 14-A tandem type air compressor



Automatic hopper-dumping weigher for bulk cement

sary for accuracy. This smaller screw is driven by its own speed reducer, motor and gearing, for it continues to run after the main screw has stopped, the dribble screw in turn being stopped automatically when the exact weight of cement has been delivered to the scale weighing hopper. Both the main screw and the dribble screw are enclosed in their own dustproof tube casing.

The scale is of standard construction with hanging weights for part of the load and a weigh beam with sliding weight for the remainder at one end of the system, and the weigh hopper for the cement is suspended at four points at the other end. Weights are placed on the weight carrier and the poise is set for any predetermined weight within the range of the scale.

As soon as the correct given weight has entered the hopper, the feeder is stopped entirely by an electric switch breaking the circuit to the driving motor of the dribble screw feeder, the main feeder by this time being at rest, and no more cement enters the scale hopper. The weigh beam balances and the accuracy of the weighing can be verified by a glance at the weigh beam swinging in the trig loop, which beam is outside the hopper housing in a beam box at the front.

The cutoff, it is claimed, is positive, entirely automatic and dustless, and the accuracy of the weighing is beyond dispute.

When used for the intermittent service of loading a mixer or truck, each weighing is discharged by pulling a hand chain which opens the weigh hopper door when a signal light indicates that the feeder has completed a weighing.

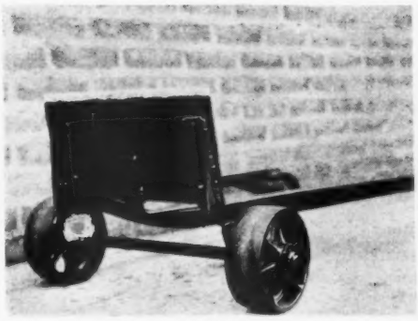
To commence the next weighing a push-button starter is provided to start the motors driving the main and dribble screw feeders. A stop-button is also provided. The motor and electrical equipment are protected by a magnetic starter and overload relay.

When the machine is used for the continuous loading of railroad cars, it is made to discharge its load, close and start weighing again, all automatically. It can be supplied to register in barrels, pounds or kilograms, according to order.

Abrasive-Resistant Prevents Wear on Hand Trucks

TO INSURE AGAINST abrasive wear, the manufacturer of the hand truck shown in the accompanying illustration has standardized on the use of an abrasive-resistant, manufactured by the Linde Air Products Co., New York City, for the wearing edge of the steel plate.

A band of Haynes Stellite about ¾ in. wide is applied along the entire under side of the front edge of the steel plate 14 in. wide, which forms the bottom of the truck. The abrasive resistant is applied to a thickness of about 1/32 in. by means of an oxy-acetylene welding blowpipe. The use of oxwelding in the fabrication of this truck is also evident in the illustration. The steel



Application of abrasive-resistant prevents wear on hand truck

plate rests on three supports to which it is secured by means of oxy-acetylene fillet welds.

The hard surfacing of the nose of this truck is a part of the regular production process and is done to insure longer life.

Indicating and Recording Conveyor Scale

A RECORDING CONVEYOR scale for weighing conveyor handled material, entirely mechanical and standardized to fit any conveyor, is being marketed by the Sintering Machinery Corp., New York City. It is known as the "Transportometer" and is supplied as a complete, self-contained unit, including idlers and all necessary details, ready to install in a conveyor line.

Standard frames, in two lengths, five widths and three heights are carried in stock by the company. The short frame is used where loads weighing over 5 lb. per foot of belt are handled, and the long frame is used where loads run between 3 and 5 lb. per foot, or where very high belt speeds make it necessary. Frames for weighing loads under 3 lb. per foot may also be had.

The platform, or weighing section, consisting of a simple frame, is suspended from the scale levers. To it are attached the suspended idlers, as shown in the illustration. The equipment includes four (or five, depending upon the length of frame used) ball- or roller-bearing idlers. Two of these are installed on the frame, one at each end as illustrated. The other two or three, as required, are attached to the platform as shown. The manufacturer states that in most cases it is possible to furnish idlers of the same make and type as those used on the conveyor, making the weigher equipment uniform with that of the conveyor.

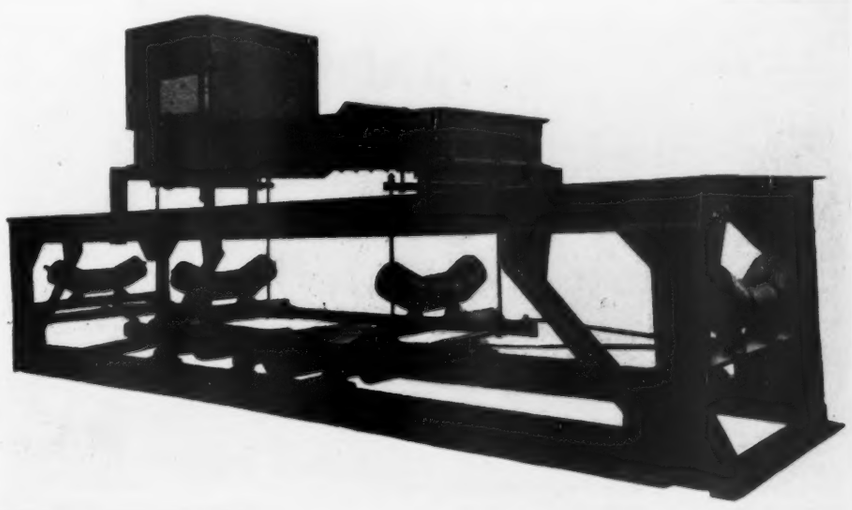
In the lower part of the frame are installed three ball-bearing idlers which carry the return belt. The center idler drives the integrator, and the two outside rollers act as bend pulleys, to retain the belt in firm contact with the center idler.

The lever system, from which the scale platform is suspended, is enclosed in a heavy, rigid, dust-proof compartment. The levers are made from seamless steel tubing, and the bearings and pivots from special steel. The suspension rods, which support the weighing section of the conveyor, are fitted with seals where they pass through the bottom sheets of the box, so that no dust can enter the lever compartment.

The integrator is also enclosed in a dust-proof box, fitted with a heavy glass front, through which the counter is read, and provision is made for lubrication from the outside so that the box need never be opened. Balancing adjustments are simple, it is said, and may be quickly made by anyone.

A chart recorder attachment can be used in connection with this conveyor scale where it is desired to retain a permanent record of the indications of the scale. The charts are driven by standard recorder clock movements, and the pens are driven by a direct connection with the cross shaft of the integrator, no electrical devices being used.

The "Transportometer," it is claimed, is being used for weighing crushed rock, limestone and lime, clinker and other cement materials, sand, gravel, gypsum, etc.



Indicating and recording conveyor scale for weighing rock products

The Rock Products Market

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Attica and Franklinville, N. Y. (a)	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.15	1.15	1.75	.....	1.75	1.75
Buffalo, N. Y.	.....	1.05	1.05	1.05	1.05	1.05
Erie, Penn.	.80	1.00	.....	.....	.....	.....
Leeds Jct., Scarboro, Me., and Milton, N. H. (c)	.....	.50	.....	1.75	1.25	1.00d
Machias Junction, N. Y.	.65	.65	.65	.....	.65	.65
Montoursville, Penn.	1.00	.75	.60	.40	.40	.40
Northern New Jersey	.20– .50	.20– .50	1.00–1.25	1.00–1.25	1.00–1.25	.....
Georgetown, D. C.	.55	.55	1.00	1.00	1.00	1.00
CENTRAL:						
Algonquin, Ill.	.30	.20	.20	.35	.35	.40
Attica, Ind.			All sizes .75–.85			
Cincinnati, Ohio	.55	.55	.80	.80	.80	.80
Columbus, Ohio	.75–1.00	.50– .75	.60– .75	.60– .75	.60– .75	.60– .75
Des Moines, Iowa	.40– .70	.40– .70	1.50–1.85	1.50–1.85	1.50–1.85	1.50–1.85
Dresden, Ohio	.....	.60	.70– .80	.75	.75	.70
Eau Claire, Wis.	.....	.55	.65	1.00	1.00	.....
Elkhart Lake and Glenbeulah, Wis.	.45	.40	.50	.55	.45	.50
Grand Rapids, Mich.	.40	.40	.70	.70	.70	.70
Greenville, Ohio	.50– .70	.40– .60	.50– .60	.50– .60	.50– .60	.50– .60
Hamilton, Ohio	.65– .75	.65– .75	.65– .75	.65– .75	.65– .75	.65– .75
Hersey, Mich.	.....	.40	.....	.70	.70	.70
Humboldt, Iowa	.....	.45	.....	.....	1.25	.....
Kalamazoo, Mich.	.....	.45	.50	.60	.75	.....
Kansas City, Mo.	.70	.70	.80	1.50	.....	.....
Mankato, Minn.	.55	.45	1.25	1.25	1.25	1.25
Mason City, Iowa	.50	.50	.85	1.25	1.25	1.25
Milwaukee, Wis.	.....	.86	.86	.96	.96	.96
Minneapolis, Minn.	.35	.35	1.35	1.35	1.35	1.25
Oxford, Mich.	.25– .35	.20– .30	.30– .40	.55– .75	.55– .75	.60– .75
St. Louis, Mo.	.45– .75	.45– .85	.50– .90	.50– .90	.50– .75	.50–1.00
St. Paul, Minn.	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Waukesha, Wis.	.....	.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	.50	1.00	1.00	1.00
SOUTHERN:						
Brewster, Fla.	.40	.....	.....	.....	.....	.....
Charleston, W. Va.	.70	1.25	1.25	.....	.....	.....
Eustis, Fla.	.....	.40– .50	.....	.....	.....	.....
Fort Worth, Tex.	1.00	1.00	1.25	1.25	1.25	1.25
Knoxville, Tenn.	.70– .90	.80–1.00	.....	.....	1.05–1.20	1.05–1.20
Roseland, La.	.40	.40	.90	.75	.75	.75
WESTERN:						
Phoenix, Ariz.	1.25*	1.15*	1.50*	1.15*	1.00*	1.00*
Pueblo, Colo.	.80	.60	.....	1.20	.....	1.15
San Gabriel, San Fernando Valleys, Cal. (b)	.80	.80	1.30	1.30	1.30	1.30
Seattle, Wash.	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*

*Cu. yd. ‡Delivered on job by truck. (a) Prices on trucks; on cars, 65c per ton for all sizes. (b) Discount, 20c per ton if paid by 10th of month following delivery. (c) In carload lots. (d) Gravel 2½-in. down to ¼-in.

Core and Foundry Sands

Silica sand quoted washed, dried, screened unless otherwise stated; per ton f.o.b. plant.

City or shipping point	Molding, fine	Molding, coarse	Molding brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.00	2.00	2.25	.....	.....	3.50	.....
Cheshire, Mass.	Sand for soap, 5.75–7.00					5.00	.....
Columbus, Ohio	1.35–1.50	1.25–1.50	2.00	1.25–1.35	.....	3.50–4.50	.....
Dresden, Ohio	1.15–1.50	1.00–1.35	1.25–1.50	1.00–1.25	1.25	.....	.....
Eau Claire, Wis.	.....	.....	.....	.....	.....	2.50–3.00	.....
Elco, Ill.	Amorphous silica, 90-99½% thru 325 mesh, 10.00–60.00 per ton						
Kasota, Minn.	.....	.....	.....	.....	.....	.....	1.00
Mendota, Va.	Flint, 8.00–10.00 per ton						
Montoursville, Penn.	.....	.....	.....	1.35–1.60	.....	.....	.....
New Lexington, Ohio	2.00	1.25	.....	.....	.....	.....	.....
Ohlton, Ohio	1.60	1.60	.....	1.75	1.60	1.75	.....
Ottawa, Ill.	.....	.....	.....	.....	.....	3.50	.....
Red Wing, Minn. (a)	.....	.....	.....	.....	1.50	3.00	1.50
San Francisco, Calif.	3.50†	5.00†	3.50†	2.50–3.50†	5.00†	3.50–5.00†	.....
South Vineland, N. J.	Dry white silica sand, per ton, 2.25						

†Fresh water washed, steam dried. *Damp. (a) Filter sand, 3.00.

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Dresden, Ohio	.....	1.00
Eau Claire, Wis.	4.30	1.00
Ohlton, Ohio	1.60	1.60
Red Wing, Minn.	.....	1.00
San Francisco, Calif.	3.50	3.50

Glass Sand

(Silica sand is quoted washed, dried and screened)

Cheshire, Mass. (in carload lots)	5.00–6.00
Klondike, Mo.	2.00
Mendota, Va.	2.50–3.00
Ohlton, Ohio	2.40
Ottawa, Ill.	1.50
Red Wing, Minn.	1.50
South Vineland, N. J.	1.75
San Francisco, Calif.	4.00–5.00

Bank Run Sand and Gravel

Algonquin, Ill.¶ (½-in. and less)	.30
Buffalo, N. Y.—Sand, 1/10-in. down, 1.00; ¼-in. down, .85; gravel, all sizes	.75
Burnside, Conn. (sand, ¼-in. and less)	.75*
Fort Worth, Tex.¶ (2-in. and less)	.70
Gainesville, Tex.¶ (1½-in. and less)	.55
Grand Rapids, Mich.¶ (1-in. and less)	.50
Hersey, Mich.¶ (1-in. and less)	.50
Kalamazoo, Mich.¶ (1½-in. and less)	.35
Mankato, Minn.†	.70
Winona, Minn.—Sand, any size	.50– .60
York, Penn.—Sand, 1/10-in. down, 1.10; ¼-in. and less	1.00

*Cu. yd. †Fine sand. 1/10-in. down. ¶Gravel.

ROCK PRODUCTS solicits volunteers to furnish accurate price quotations.

Portland Cement

	F.o.b. city named Per Bag	Per Bbl.	High Early Strength
Albuquerque, N. M.	.82½	3.30	.....
Atlanta, Ga.	.....	2.19*	3.49¶
Baltimore, Md.	.....	†2.23–2.26*	3.56¶
Birmingham, Ala.	.....	1.85*	3.15¶
Boston, Mass.	.46¼	†1.85–1.88*	3.27¶
Buffalo, N. Y.	.48	†1.92–1.95*	3.25¶
Cedar Rapids, Ia.	.....	2.23*	.....
Charleston, S. C.	.....	1.85†	3.26¶
Cheyenne, Wyo.	.60¾	2.43	.....
Chicago, Ill.	.....	1.95*	3.25¶
Cincinnati, Ohio	.....	2.14*	3.44¶
Cleveland, Ohio	.....	2.04*	3.34¶
Columbus, Ohio	.....	2.17*	3.47¶
Dallas, Texas	.....	1.90*	3.49¶
Davenport, Iowa	.....	2.14*	.....
Dayton, Ohio	.....	2.14*	3.44¶
Denver, Colo.	.66¼	2.65	.....
Des Moines, Iowa	.48½	2.29*	.....
Detroit, Mich.	.....	1.95*	3.25¶
Duluth, Minn.	.....	2.04*	.....
Houston, Texas	.....	2.00*	3.73¶
Indianapolis, Ind.	.54¾	1.99*	3.29¶
Jackson Miss,	.....	2.29*	3.59¶
Jacksonville, Fla.	.....	2.16†	3.46¶
Jersey City, N. J.	.....	†2.10–2.13*	3.43¶
Kansas City, Mo.	.50½	2.02*	3.32¶
Los Angeles, Calif.	.57½	2.30	.....
Louisville, Ky.	.55½	2.12*	3.42¶
Memphis, Tenn.	.....	2.29*	3.59¶
Milwaukee, Wis.	.....	2.10*	3.40¶
Minneapolis, Minn.	.....	2.27*	.....
Montreal, Que.	.....	1.60‖	.....
New Orleans, La.	.....	1.92†	3.22¶
New York, N. Y.	.50	†2.00–2.03*	3.33¶
Norfolk, Va.	.....	1.97*	3.27¶
Oklahoma City, Okla.	.61½	2.46*	3.76¶
Omaha, Neb.	.59	2.36*	3.66¶
Peoria, Ill.	.....	2.12*	.....
Pittsburgh, Penn.	.....	†1.92–1.95*	3.25¶
Philadelphia, Penn.	.....	†2.12–2.15*	3.45¶
Portland, Ore.	.....	2.50†	.....
Reno, Nev.	.....	2.96†	.....
Richmond, Va.	.....	†2.29–2.32*	3.62¶
San Francisco, Calif.	.....	2.24‡	.....
Savannah, Ga.	.....	1.85†	.....
St. Louis, Mo.	.48¾	1.95*	3.25¶
St. Paul, Minn.	.....	2.27*	.....
Seattle, Wash.	.....	1.50–1.75	2.40c
Tampa, Fla.	.....	2.00†	.....
Toledo, Ohio	.....	*2.10–2.20†	3.50¶
Topeka, Kan.	.55¼	2.21*	3.51¶
Tulsa, Okla.	.58¼	2.33*	3.63¶
Wheeling, W. Va.	.....	†1.99–2.02*	3.32¶
Winston-Salem, N.C.	.....	2.44*	3.74¶
Mill prices f.o.b. in carload lots, without bags, to contractors.			
Albany, N. Y.	.....	2.15	.....
Bellingham, Wash.	.....	2.25	.....
Bonner Springs, Kan.	.....	1.85	3.15¶
Buffington, Ind.	.....	1.70	.....
Concrete, Wash.	.....	2.65	.....
Hannibal, Mo.	.....	1.80	.....
Hudson, N. Y.	.....	†1.97	3.30¶
Independence, Kan.	.....	1.85	.....
Leeds, Ala.	.....	1.70	.....
Limedale, Ind.	.....	1.70	.....
Lime & Oswego, Ore.	.....	2.50	.....
Nazareth, Penn.	.....	2.15	.....
Northampton, Penn.	.....	1.75	.....
Richard City, Tenn.	.....	2.05	.....
Steelton, Minn.	.....	1.85	.....
Toledo, Ohio	.....	2.20	.....
Universal, Penn.	.....	1.70	.....
Waco, Tex.	.....	1.85	.....

NOTE: Unless otherwise noted, prices quoted are net prices, without charge for bags. Add 40c per bbl. for bags. *Includes dealer and cash discounts. †Includes 10c cash discount. ‡Subject to 2% cash discount. ¶"Incor" Perfected, prices per bbl. packed in paper sacks, subject to 10c discount 15 days. ‖Includes sales tax. (c) Quick-hardening "Velo," packed in paper bags.

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chazy, N. Y.	.75	1.60	1.60	1.30	1.30	1.30
Farmington, Conn. (a)	1.00	1.30	1.30	1.00	1.00	.....
Ft. Spring, W. Va.	.35	1.35	1.35	1.25	1.15	1.00
Frederick, Md.	.50–1.00	1.50	1.15–1.50	1.15–1.50	1.05–1.25	1.05–1.25
Oriskany Falls and Munnsville, N. Y.	.50–1.00	.....	.....	1.00–1.35	.....	.....
Prospect Junction, N. Y.	.50– .80	.....	1.00–1.15	1.00–1.10	1.00–1.10	.....
Rochester, N. Y.—Dolomite	1.50e	.....	.....	.....	.....	.....
Hillsville, Penn.	.85	1.35	1.35	1.35	1.35	1.35
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill.	1.75	.....	1.75	.....	.....	.....
Afton, Mich.	.25	.25	.25	.....	.65	1.50
Cypress, Ill.	1.25	.90	.90	.90	.85	.85
Dubuque, Iowa	1.10	1.10	1.10	1.10	1.10	.....
Stolle and Falling Springs, Ill.	1.05–1.70	.95–1.70	1.15–1.70	1.05–1.70	1.05–1.70	.....
Greencastle, Ind.	1.25	1.00	1.00	.90	.90	.90
Lannon, Wis.	.80	.80	.80	.80	.80	.80
Sheboygan, Wis.	1.20	1.20	1.10	1.10	.....	.....
Stone City, Iowa	.75	.....	1.10	1.00	1.00	1.00f
Toledo, Ohio	1.60	1.70	.....	1.60	.....	1.60
Toronto, Canada (j)	2.10	2.10	2.10	2.10	2.10	2.10
Waukesha, Wis.	.....	.90	.90	.90	.90	.....
SOUTHERN:						
Bridgeport, Chico and Knippa, Texas	1.00–1.10	1.25–1.30	1.20–1.25	1.15–1.20	1.10–1.15	1.05–1.10
Cartersville, Ga.	.75	1.15	1.15	1.00	.90	.90
El Paso, Texas	.50– .75	1.25	1.25	1.00	1.00	1.00
Olive Hill, Ky.	.50	1.00	1.00	.90	.90	.90
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.70
Blue Springs and Wymore, Neb. (h)	.25	.25	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	.90	1.25	1.25	1.25	1.00	.....
Rock Hill, St. Louis Co., Mo.	1.30–1.40	1.30–1.40	1.10–1.40	1.30–1.40	1.30–1.40	1.30–1.40
Stringtown, Okla.	1.00–1.10	1.25–1.30	1.20–1.25	1.15–1.20	1.10–1.15	1.05–1.10

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn.	1.20	1.60	1.45	1.35	.....	1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	.....
Bridgeport, Chico and Knippa, Texas	2.25–2.50	1.80–2.00	1.50–1.60	1.30–1.40	1.20–1.30	1.00–1.25
Duluth, Minn.	1.00	2.25	1.75	1.65	1.35	1.25
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	.....
Northern New Jersey	1.35–1.40	1.70–2.10	1.90	1.50	1.50	.....
Richmond, Calif.	.75	1.00	1.00	1.00	1.00	.....
Stringtown, Okla.	2.25–2.50	1.80–2.00	1.50–1.60	1.30–1.40	1.20–1.30	1.00–1.25
Toronto, Canada (j)	4.70	5.80	4.05	4.05	.....	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Cayce, S. C.—Granite	.....	.....	1.60	1.60	1.50	.....
Eastern Pennsylvania—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40b
Eastern Pennsylvania—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Lithonia, Ga.—Granite	.50	1.25	1.25	1.15	1.15	.....
Lohrville, Wis.—Granite	1.80	1.60	.....	1.50	1.50	.....
Middlebrook, Mo.—Granite	3.00–3.50	.....	2.00–2.25	2.00–2.25	.....	1.25–3.00
San Gabriel and San Fernando Valleys, Calif. (Granite)	.....	1.30	1.30	1.30	.....	1.30
(Basalt)	.....	.....	.....	.85	.....	.....
Toccoa, Ga.—Granite	.35	.....	1.25	1.25	1.00	1.00

(a) Stone 1-in., 1.10 per net ton. (b) Ballast. (c) 1-in., 1.40. (d) 2-in., 1.30. (e) Less 10c. (f) Rip rap. (g) Cu. yd. (h) Rip rap, 1.20–1.40 per ton. (j) All prices less 5% for payment 15th following month.

Crushed Slag

City or shipping point	Roofing	¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem, Penn.	1.25–1.50	.50– .60	1.00	.60– .70	.70– .80	.70– .90	.90
Buffalo, N. Y., Erie and Du Bois, Penn.	2.25	1.25	1.25	1.35	1.25	1.25	1.25
Hokendauqua, Penn.	1.50	.60	1.00	.80–1.00	1.00–1.25	1.00–1.25	1.00–1.25
Western Pennsylvania	2.00	1.25	1.25	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.30*	1.80*	1.45*	1.45*	1.45*	.....
Jackson, Ohio	2.05*	.65*	1.80*	1.30*	1.05*	1.30*	.....
Toledo, Ohio	1.50	1.10	1.35	1.35	1.35	1.35	1.35
SOUTHERN:							
Ashland, Ky.	2.05*	1.05*	1.80*	1.45*	1.45*	1.45*	.....
Ensley and Birmingham, Ala.	2.05	.55	1.25	1.15	.90	.90	.90
Longdale, Va.	2.50	1.25	1.25	1.25	1.25	1.15	1.05
Woodward, Ala.†	2.05*	.55*	.....	1.15*	.90*	.90*	.....

5c per ton discount on terms. †1½-in. to ¼-in., 1.05; ⅜-in. to 10 mesh, 1.25*; ⅝-in. to 0-in., 90c*; ¼-in. to 10 mesh, .80*.

Agricultural Limestone (Pulverized)

Alton, Ill.—Analysis, 99% $CaCO_3$; 0.3% $MgCO_3$, 90% thru 100 mesh 4.75

Cape Girardeau. Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 50% thru 50 mesh 1.50

Cartersville, Ga. 2.00

Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, per ton 6.00

Gibsonburg, Ohio—Bulk, 2.25; in bags 3.70

Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; in bags 5.00

Jamesville, N. Y.—Bulk, 3.70; in 80-lb. bags 4.95

Knoxville, Tenn.—Analysis, 52% $CaCO_3$; 36% $MgCO_3$; 80% thru 100 mesh, in 100-lb. paper bags, 3.75; bulk 2.50

Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton 2.00

Middlebury, Vt.—Analysis, 99.05% $CaCO_3$; 90% thru 50 mesh 4.25

West Rutland, Vt. — Analysis, 96.5% $CaCO_3$; 1% $MgCO_3$; 90% thru 50 mesh; bags, per ton, 4.25; bulk 2.50

Agricultural Limestone (Crushed)

Bedford, Ind.—Analysis, 98.44% $CaCO_3$; 0.83% $MgCO_3$; 95% thru 10 mesh 1.50

Cartersville, Ga.—50% thru 50 mesh, per ton 1.25

Colton, Calif.—Analysis, 95-97% $CaCO_3$; 1.31% $MgCO_3$, all thru 14 mesh down to powder 3.50

Cypress, Ill. — Analysis, 96% $CaCO_3$; 90% thru 100 mesh, 1.25; 50% thru 100 mesh, 1.25; 90% thru 50 mesh, 1.25; 50% thru 50 mesh, 1.25; 90% thru 4 mesh, 1.25, and 50% thru 4 mesh 1.25

Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 4 mesh, 50% thru 20 mesh; bulk, per ton 1.00

Dubuque, Ia.—Analysis, 64.20% $CaCO_3$; 32.64% $MgCO_3$; 90% thru 50 mesh 1.10

Fort Spring, W. Va.—Analysis, 90% $CaCO_3$; 3% $MgCO_3$; 50% thru 100 mesh; bulk, per ton 1.15

Gibsonburg, Ohio—90% thru 10 mesh 1.00–1.50

Lannon, Wis. — Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh 2.00
Screenings (¼-in. to dust) 1.00

Marblehead, Ohio—90% thru 100 mesh 3.00
90% thru 50 mesh 2.00
90% thru 4 mesh 1.00

Marlbrook, Va.—Precipitated lime-marl. Analysis, 96% $CaCO_3$; 1% $MgCO_3$, 90% thru 50 mesh, bulk, 2.25; in burlap bags 3.75

Olive Hill, Ky.—90% thru 4 mesh, per ton 50–1.00

Branchton, Penn.—100% thru 20 mesh, 60% thru 100 mesh, and 45% thru 200 mesh, per ton a5.00

Piqua, Ohio—30%, 50% and 99% thru 100 mesh 1.00–4.00

Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh 1.15–1.70

Stone City, Ia.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh ..... .75

West Stockbridge, Mass.* — Analysis, 95% $CaCO_3$; 90% thru 50 mesh, bulk 3.50
100-lb. paper bags, 4.75; 100-lb., cloth .. 5.25

Waukesha, Wis.—90% thru 100 mesh, 4.00; 50% thru 100 mesh 2.10

*Less 25c cash 15 days. (a) Less 50c comm.

Pulverized Limestone for Coal Operators

Davenport, Iowa—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, ton .. 6.00

Joliet, Ill.—Analysis, 48% $CaCO_3$; 42% $MgCO_3$; 90% thru 200 mesh (bags extra) 3.50

Piqua, Ohio—99% thru 100 mesh, bulk, 3.25; in 80-lb. or 100-lb. bags 4.25

Rocky Point, Va.—Analysis, 97% $CaCO_3$; 75% $MgCO_3$; 85% thru 200 mesh, bulk 2.25–3.50

Waukesha, Wis.—90% thru 100 mesh, bulk 4.00

Lime Products

(Carload prices per ton f.o.b. shipping point unless otherwise noted)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Bulk	Ground burnt lime, Bags	Lump lime In bulk	Lump lime In bbl.
EASTERN:								
Berkeley, R. I.			11.40			17.50		20.65
Buffalo, N. Y.				11.00				
Cedar Hollow, Devault, Mill Lane, Knickerbocker, Rambo and Swedeland, Penn.		9.50b	9.50b	9.50b	8.00f	9.50d	8.50	
Frederick, Md.		8.50	8.50	8.50		8.50	6.50	13.50
Lime Ridge, Penn.			8.50		6.00	7.50[1]	4.50	
West Stockbridge, Mass.		8.25–8.75	8.25–8.75			13.50h	10.00	15.35
CENTRAL:								
Afton, Mich.						10.85	6.50	
Cold Springs, Ohio		6.00	6.00				6.00	
Gibsonburg, Ohio	7.75		6.00		6.00	8.00	6.00	
Huntington, Ind.		6.00			6.00			
Marblehead, Ohio		6.00	6.00	11.00			6.00	
Milltown, Ind.		9.00	8.25	9.50	7.50		7.00	
Scioto, Ohio	7.75	6.00	6.00	7.00			6.00	15.00
Sheboygan, Wis.		10.50	10.50	10.50			9.50	20.00e
White Rock, Ohio	7.75		6.00		6.00	8.00	6.00	
Woodville, Ohio	7.75	6.00	6.00	9.00	6.00	8.00	6.00	15.00c
SOUTHERN:								
Keystone, Ala.	17.00	7.00		7.00–8.00	5.00g	11.55	5.00a	12.65
Knoxville, Tenn.		6.00–7.00	6.00–7.00	6.00–7.00			4.50j	
Ocala, Fla.		10.00						9.50
Pine Hill, Ky.		9.00	8.00	7.50–9.00			6.00	12.50
WESTERN:								
Little Rock, Ark.		14.30		14.30			11.90	
Kirtland, N. M.							15.00	
Los Angeles, Calif.	15.50	15.50					13.50	18.00
San Francisco, Calif.†	20.00	20.00	12.00	20.00				
San Francisco, Calif.	19.00	14.00–17.00	12.50	14.00–19.00	14.50[5]		11.00[4]	

[1]In 100-lb. bags. [4]To 14.50. [5]Also 13.00. *Price to dealers. †Wood-burnt lime: finishing hydrate, 20.00 per ton; pulv. lime, 2.00 per iron drum. Oil-burnt pulv. lime, 13.00–14.50 per ton. (a) To 7.00. (b) In 50-lb. paper. (c) In steel; in wood, 14.00. (d) In 80-lb. paper bags. (e) In steel. (f) For chemical purposes. (g) To 7.00. (h) To 17.50. (j) To 5.50.

Wholesale Prices of Slate

Prices given are f.o.b. at producing point or nearest shipping point

Slate Flour

Pen Argyl, Penn.—Screened, 300 mesh, 7.00 per ton in paper bags

Slate Granules

Esmont, Va.—Blue, 7.50 per ton.

Granville, N. Y.—Red, green and black, 7.50 per ton.

Pen Argyl, Penn.—Blue-black, 6.00 per ton in bulk.

Roofing Slate

City or shipping point	Prices per square—Standard thickness 3/16-in.	¼-in.	⅜-in.	½-in.	¾-in.	1-in.
Bangor, Penn.—						
Gen. Bangor No. 1 clear	10.00–14.00	20.00	25.00	29.00	40.00	50.00
Gen. Bangor No. 1 ribbon	9.00–10.25	16.00	20.00	25.00	35.00	46.00
No. 1 Albion	7.25–10.50	16.00	23.00	27.00	37.00	46.00
Gen. Bangor No. 2 ribbon	6.75–7.25					
Granville, N. Y.—						
Sea green, weatheripg	14.00	24.00	30.00	36.00	48.00	60.00
Semi-weathering, green & gray	15.40	24.00	30.00	36.00	48.00	60.00
Mottled purple & unfading gr'n	21.00	24.00	30.00	36.00	48.00	60.00
Red	27.50	33.50	40.00	47.50	62.50	77.50
Pen Argyl, Penn.						
Graduated slate		16.00	23.00	27.00	37.00	46.00
No. 1 clear (smooth text)	7.25–10.50; Albion-Bangor medium, 8.00–9.00; No. 1 ribbon, 8.00–8.50					

(a) Prices are for standard preferred sizes (standard 3/16-in. slates), smaller sizes sell for lower prices.
(b) Prices other than 3/16-in. thickness include nail holes.
(c) Prices for punching nail holes, in standard thickness slates, vary from 50c to $1.25 per square.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:
- Crude talc, per ton — 5.00
- Ground talc (20-50 mesh), bags — 6.50
- Ground talc (150-200 mesh), bags — 9.00
- Pencils and steel crayons, gross — 1.50–2.00

Chester, Vt.—Finely ground talc (carloads), Grade A—99-99¼% thru 200 mesh, 8.00–8.50; Grade B, 97-98% thru 200 mesh — 7.50–8.00
1.00 per ton extra for 50-lb. paper bags; 166⅔-lb. burlap bags, 15c each; 200-lb. burlap bags, 18c each. Credit for return of burlap bags. Terms 1%, 10 days.

Clifton, Va.:
- Ground talc (150-200 mesh), in bags — 10.00

Emeryville, N. Y.:
- Ground talc (200 mesh), bags — 13.75
- Ground talc (325 mesh), bags — 14.75

Hailesboro, N. Y.:
- Ground talc (300-350 mesh), in 200-lb. bags — 15.00–20.00

Henry, Va.:
- Crude (mine run), bulk — 3.00–4.50
- Ground talc (150-200 mesh), in bags — 6.25–8.25

Joliet, Ill.:
Ground talc (200 mesh), in bags:
- California talc — 30.00
- Southern talc — 20.00
- Illinois talc — 10.00

Los Angeles, Calif.:
- Ground talc (150-200 mesh), in bags — 15.00–25.00

Natural Bridge, N. Y.:
- Ground talc (325 mesh), bags — 10.00–15.00

Rock Phosphate

Prices given are per ton (2240 lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

- Gordonsburg, Tenn.—B.P.L. 65-70% — 3.50–4.00
- Mt. Pleasant, Tenn.—B.P.L. 73% — 6.25

Ground Rock
(2000 lb.)

- Gordonsburg, Tenn.—B.P.L. 65-70% — 3.50–4.00
- Mt. Pleasant, Tenn.—(Lime phosphate)—B.P.L. 75%, without bags — 11.80
- Mt. Pleasant, Tenn.—B.P.L. 72% — 5.00–5.25

Florida Phosphate

(Raw Land Pebble)

Mulberry, Fla.—Gross ton, f.o.b. mines
- 68/66% B.P.L. — 3.15
- 70% minimum B.P.L. — 3.75
- 72% minimum B.P.L. — 4.25
- 75/74% B.P.L. — 5.25
- 77/76% B.P.L. — 6.25

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Rumney Depot, Bristol and Cardigan, N. H.—Per ton:
- Punch mica, per ton — 150.00–240.00
- Mine scrap — 22.50
- Mine run — 325.00
- Clean shop, scrap — 25.00
- Roofing mica — 37.50
- Trimmed mica, per ton, 20 mesh, 37.50; 40 mesh, 40.00; 60 mesh, 40.00; 100 mesh, 45.00; 200 mesh — 60.00

Spruce Pine, N. C.—Mine scrap, per ton — 18.00–20.00

Trenton, N. J.—Mine scrap, per ton, f.o.b. mines — 18.00

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

City or shipping point	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gaging Plaster	Wood Fiber	Gaging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ½x32x 36". Per M Sq. Ft.	⅜x32x 36". Per M Sq. Ft.	Wallboard. ⅜x32 or 48" Lengths 6'-10'. Per M Sq. Ft.
East St. Louis, Ill.—Special Gypsum Products—Partition section, 4 in. thick, 12 in. wide, and up to 10 ft. 3 in. long, 12c per ft., 21.00 per ton; outside wall section and interior bearing wall section, 6 in. wide, 6 in. thick, and up to 10 ft. 3 in. long, 25c per ft., 30.00 per ton; floor section, 7 in. thick, 16 in. wide, and up to 13 ft. 6 in. long, 17c per ft., 23.00 per ton.													
Grand Rapids, Mich.				9.00	9.00	9.00					15.00	15.00	27.00
Los Angeles, Calif. (a)		7.50	7.50	10.00	12.20		13.20						
Medicine Lodge, Kan.	1.45						11.50b		16.00d				
San Francisco, Calif.					14.90b								
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00					20.00	25.00e	33.00d

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable). (a) ⅜-in. plaster lath, 16c per sq. yd. (b) Includes paper bags. (c) Includes jute sacks. (d) "Gyproc," ½-in.x48-in. by 5 and 10 ft. long. (e) ⅜x48-in. by 3 to 4 ft. long.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon, Vt.—English pink, cream and coral pink	¶12.50–¶14.50	¶12.50–¶14.50
Cranberry Creek, N. Y.—Bio-Spar, per ton in bags in carload lots, 9.00; less than carload lots, per ton in bags		12.00
Crown Point, N. Y.—Mica Spar	¶9.00–¶12.00	
Davenport, Iowa — White limestone, in bags, ton	¶6.00	¶6.00
Middlebrook, Mo.—Red	20.00–25.00	
Middlebury, Vt.—White	¶9.00–¶10.00	
Middlebury and Brandon, Vt.—Caststone, per ton, including bags		c5.50
Phillipsburg, N. J.—Royal green granite, in bags	15.00–18.00	
Tuckahoe, N. Y.	7.00	
Warren, N. H. (d)	¶8.00– 8.50	

¶C.L. ‖L.C.L. (a) Including bags. (b) In burlap bags, 2.00 per ton extra. *Per 100 lb. (c) Per ton f.o.b. quarry in carloads; 7.00 per ton L.C.L. (d) L.C.L., 9.50–15.00 per ton in 100-lb. bags.

Granular Glasspar

(Chemically Controlled)

Spruce Pine, N. C.—Color, white; analysis, K_2O, 7.20%; Na_2O, 3.70%; SiO_2, 70%; Fe_2O_3, 0.05%; Al_2O_3, 17.50%; per ton, in bulk — 10.50

Soda Feldspar

De Kalb Jct., N. Y.—Color, white; pulverized (bags extra, burlap 2.00 per ton, paper 1.20 per ton); 99% thru 140 mesh, 16.00; 99% thru 200 mesh — 18.00

Spruce Pine, N. C.—(Chemically controlled.) Color, white; 200 mesh; analysis, K_2O, 5.50%; Na_2O, 5.50%; SiO_2, 68.80%; Fe_2O_3, 0.10%; Al_2O_3, 18.60%; per ton, in bulk — 18.00

Potash Feldspar

Keystone, S. D.—Color, white; analysis, K_2O, 12.50%; NaO, 2.25%; SiO_2, 64%; Fe_2O_3, 0.03%; Al_2O_3, 20%, pulverized, 99% thru 200 mesh; in bags, 16.00; bulk — 15.00
Crude, in bags, 7.50; bulk — 6.50

East Liverpool, Ohio — Color, white; analysis, K_2O, 11.00%; Na_2O, 2.25%; SiO_2, 68.00%; Fe_2O_3, .08%; Al_2O_3, 17.95%, pulverized, 99% thru 200 mesh, in bags, 22.00; in bulk — 20.00

Erwin, Tenn.—White; analysis, K_2O, 10.50%; Na_2O, 2.75%; SiO_2, 67.75%; Fe_2O_3, .08%; Al_2O_3, 18.00%, pulverized, 98% thru 200 mesh, in bags, 16.00; bulk — 15.00
Crude, in bags, 7.50; bulk — 6.50

Spruce Pine, N. C.—(Chemically controlled.) Color, white; 200 mesh; analysis, K_2O, 11.30%; Na_2O, 2%; SiO_2, 67%; Fe_2O_3, 0.10%; Al_2O_3, 18.60%; per ton, in bulk — 18.00

West Paris, Me.—(Chemically controlled.) Color, white; 200 mesh; analysis, K_2O, 11.20%; Na_2O, 3.20%; SiO_2, 65.70%; Fe_2O_3, 0.09%; Al_2O_3, 19.20%; per ton, in bulk — 19.00

Rochester, N. Y.—Color, white; analysis, K_2O, 12.50%; Na_2O, 2.60%; SiO_2, 64.20%; Fe_2O_3, 0.06%; Al_2O_3, 19.10% pulverized 98% thru 200 mesh; in bags, 23.50; bulk — 22.00

Cement Drain Tile

Graettinger, Iowa — Drain tile, per foot; 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in., 1.35; 36-in. — 2.00

Grand Rapids, Mich.—Drain tile, per 1000 ft.

4-in.	40.00	15-in.	325.00
5-in.	50.00	18-in.	450.00
6-in.	75.00	20-in.	600.00
8-in.	110.00	22-in.	750.00
10-in.	165.00	24-in.	850.00
12-in.	190.00		

Chicken Grits

Cypress, Ill.—(Agstone)	1.15
Chico, Tex.—Hen size and Baby Chick, packed in 100-lb. sacks, per 100-lb. sack, f.o.b. Chico	1.00
Davenport, Iowa—High calcium carbonate limestone, in bags, L.C.L., per ton	6.00
El Paso, Tex.—(Limestone), per 100-lb. sack	.75
Los Angeles, Calif.—(Gypsum), per ton, including sacks	7.50– 9.50
Middlebury, Vt.—Per ton (a)	10.00
Piqua, Ohio—(Pearl grit), No. 1 and No. 2	1.00– 4.00
Port Clinton, Ohio—(Gypsum), per ton	6.00
Warren, N. H.	8.50– 9.50
Waukesha, Wis.—(Limestone), per ton	8.00
West Stockbridge, Mass.	¶7.50–¶9.00

(a) F.o.b. Middlebury, Vt. ¶C.L. ‖L.C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis. (f.o.b.) Barton	9.50
Dayton, Ohio	12.50
Detroit, Mich.	‡13.00–15.50*
Flint, Mich.	15.50‡
Grand Rapids, Mich.	14.00
Iona, N. J.	10.50–12.00
Jackson, Mich.	13.00
Madison, Wis.	12.50†
Milwaukee, Wis.	12.50*
Minneapolis and St. Paul, Minn.	9.50*
Mishawaka, Ind.	11.00
New Brighton, Minn.	10.00
Pontiac, Mich.	11.50
Saginaw, Mich.	13.50
Sebewaing, Mich. (at yard)	12.50
Syracuse, N. Y.	18.00–20.00
Toronto, Canada	a10.00–‡13.00*
Wilkinson, Fla.—White, 10.00; buff	14.00
Winnipeg, Canada	15.00

*Delivered on job. †Less 50c dis. per M 10th of month. ‡5% disc., 10 days. §Delivered in city. (a) Also 12.00.

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point.

City or shipping point	
Beloit, Wis.:	
8x8x16. Each	.15§
8x8x16. Each	.21‡
4x8x16. Each	.11§
6x8x16. Each	.13§
10x8x16. Each	.19§
Brookville, Penn.: 8x8x16	20.00–23.00*
Camden, N. J.: 8x8x16, each	.18
Chicago, Ill.:	
8x8x16. Each	.17§
8x8x16. Each	.20a
Columbus, Ohio: 8x8x16	14.00§–16.00‡
Graettinger, Iowa	.18– .20
Indianapolis, Ind.	.10– .12‡
Lexington, Ky.:	
8x8x16	‡18.00*
8x8x16	†16.00*
Los Angeles, Calif.:	
4x8x12	4.50*
4x6x12	3.90*
4x4x12	2.90*
Omaha, Neb.:	
8x 4x16, each .06½§; 8x6x16, each	.09§
8x 8x16, each .10§; 8x8x16, each	.12‡
8x12x16, each	.15§
Oak Park, Ill.:	
8x8x16, per 1000	160.00
Pittsburgh, Penn. (Prices at yard)	
8x 8x16. Each	.17§
8x 8x16. Each	.19a
8x12x16. Each	.20§
8x12x16. Each	.22a
Wichita, Kan.:	
8x8x16. Each	.11§

*Price per 100 at plant.
†Rock or panel face.
‡Face. §Plain. (a) Rock face.

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Cicero, Ill.—French, Spanish, Closed End Shingle, and English Shingle, per sq.	9.50–13.00
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00
Lexington, Ky.—8x15, per sq.:	
Red	15.00
Green	18.00
Longview, Wash.:	
4x6x12-in., per 1000	55.00
4x8x12-in., per 1000	65.00
New York City, N. Y.:	
Roofing tile, per sq.	10.00–13.00

Cement Building Tile

Oak Park, Ill. (Haydite):	
8x 8x16, per 100	20.00
Lexington, Ky.:	
5x8x12, per 1000	55.00
4x5x12, per 1000	35.00
Longview, Wash. (Stone Tile):	
4x6x12, per 1000, at plant	54.00
4x8x12, per 1000, at plant	64.00

Wichita, Kan.: (Duntile)

	Plain	Glazed
8x8x12. Each	.10½	.14
6x8x12. Each	.09½	.13
4x5x12. Each	.05	.08
4x4x12. Each	.04½	.07½

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Beloit, Wis.	18.00	28.00– 35.00
Camden & Trenton, N. J.	17.00	
Oak Park, Ill., "Haydite"	16.00	
Ensley, Ala., "Slagtex"	8.00–10.00	
Longview, Wash.	16.50	22.00– 40.00
Milwaukee, Wis.	13.00	20.00– 36.00
Omaha, Neb.	18.00	30.00– 40.00
Prairie du Chien, Wis.	14.00	22.00– 25.00
Rapid City, S. D.	16.00	30.00

Fullers Earth

Prices per ton in carloads, f.o.b. Florida shipping points. Bags extra and returnable for full credit.

16– 30 mesh	20.00
30– 60 mesh	22.00
60–100 mesh	18.00
100 mesh and finer	9.00
Joliet, Ill.—All passing 100 mesh. Price per ton, f.o.b. Joliet, including cost of bags	24.00

Stone-Tile Hollow Brick

Prices are net per thousand, f.o.b. plant.

	No. 4	No. 6	No. 8
Albany, N. Y.*†	40.00	60.00	70.00
Asheville, N. C.	35.00	50.00	60.00
Atlanta, Ga.	29.00	42.50	53.00
Brownsville, Tex.	.....	53.00	62.50
Brunswick, Me.†	40.00	60.00	80.00
Charlotte, N. C.	35.00	45.00	60.00
De Land, Fla.	30.00	50.00	60.00
Farmingdale, N. Y.	37.50	50.00	60.00
Houston, Tex.	35.00	45.00	60.00
Jackson, Miss.	45.00	55.00	65.00
Klamath Falls, Ore.	65.00	75.00	85.00
Longview, Wash.	.....	55.00	64.00
Los Angeles, Calif.	29.00	39.00	45.00
Mattituck, N. Y.	45.00	55.00	65.00
Medford, Ore.	50.00	55.00	70.00
Memphis, Tenn.	50.00	55.00	65.00
Mineola, N. Y.	45.00	50.00	60.00
Nashville, Tenn.	30.00	49.00	57.00
New Orleans La.	35.00	45.00	60.00
Norfolk Va.	35.00	50.00	65.00
Passaic, N. J.	40.00	52.50	70.00
Patchogue, N. Y.	.....	60.00	70.00
Pawtucket, R. I.	35.00	55.00	75.00
Safford, Ariz.	32.50	48.75	65.00
Salem, Mass.	40.00	60.00	75.00
San Antonio, Tex.	37.00	46.00	60.00
San Diego, Calif.	35.00	44.00	52.50

Prices are for standard sizes—No. 4, size 3½x4x12 in.; No. 6, size 3½x6x12 in.; No. 8, size 3½x8x12 in. *Delivered on job. †10% discount.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4-in.	6-in.	8-in.	10-in.	12-in.	15-in.	18-in.	20-in.	22-in.	24-in.	27-in.	30-in.	36-in.	42-in.	48-in.	54-in.	60-in.
Grand Rapids, Mich. (b)																	
Sewer	.....	.12	.18–.20	.27½	.35	.57½	1.00	1.11	1.48	1.66	.....	.....	.....	.....	.....	.....	.....
Culvert	.....	.....	.....	.57	.67	.93	1.20	.....	1.48	1.80	2.10	2.25	3.35	4.00	5.10	5.85	7.42
Indianapolis, Ind. (a)	.....	.....	.....	.75	.85	.90	1.15	.....	.....	1.60	.....	2.50	.....	.....	.....	.....	.....
Mercedes, Texas																	
Tongue and groove	.....	.20	.23	.29	.35	.....	.74	.91	.....	1.38	.....	2.28	.....	.....	.....	.....	.....
Sewer	.16	.22	.32	.41	.53	.78	1.05	.....	.....	1.98	.....	.....	.....	.....	.....	.....	.....
Milwaukee, Wis.						Cast stone window sills, 5 in. x 5½ in., 60c per lineal ft.											
Newark, N. J. (d)	.....	.....	.....	.....	.90	1.15	1.50	.....	.....	1.85	2.35	2.76	3.77	4.93	6.21	7.66	9.28
Unreinforced	.....	.16	.25	.37	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk, Neb.	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Tiskilwa, Ill.	.....	.....	.....	.75	.85	.95	1.20	1.60	.....	2.00	.....	2.75	3.40	.....	6.50	.....	10.00
Wahoo, Neb. (c)	.....	.....	.....	.....	.85½	.....	1.14	.....	.....	1.81	.....	2.47	3.42	4.13	5.63	6.49	7.31

†21-in. diam. (a) 24-in. lengths. (b) Sewer, 21-in., 1.29; culvert, 21-in., 1.45. (c) Reinforced, 15.40 per ton, f.o.b. plant. (d) Reinforced, 21-in., 1.69; unreinforced, 21-in., 1.26; 5% cash discount.

Pennsylvania Stone Producers Meet

THE WINTER MEETING of the Pennsylvania Stone Producers Association was held at the Penn-Harris hotel, Harrisburg, Penn., on November 24-25, 1930.

The meeting, after being called to order by President F. T. Gucker, considered the advisability of maintaining quarters for the convenience and entertainment of visiting delegates to the Association of State Highway Officials' convention. A motion by M. L. Jacobs and seconded by Ellwood Gilbert to approve of such expenses was favorably passed.

The Pennsylvania Stone Producers also passed a motion of H. B. Allen to advertise in certain Pennsylvania building and construction papers.

The sales contract committee rendered a report containing recommendations as to the type of sales contract to be used by the industry. John Rice, Jr., made a motion, seconded by F. O. Earnshaw, that the contract be temporarily approved, subject to further revision after consulting with other aggregate associations.

A committee was appointed, after a discussion on the subject, to confer with other aggregate interests to work out a solution of the present surety bond situation.

At the session the following day, F. O. Earnshaw, acting as president, had a discussion that occupied the entire morning session on the subject of 1931 specifications, covering the sizes of crushed stone.

The following changes were recommended to the state highway department:

No. 1 screenings be changed to read 10 to 35% passing 20-mesh.

No. 2 chips be changed to read 85 to 100% passing 1¼-in. and 100% passing 1½-in.

No. 4 penetration stone be changed to 35 to 75% passing 2-in. screen.

No. 5 ballast; 0 to 10% through 1¼-in., 30 to 65% passing 2½-in., 85 to 100% passing 3½-in. and 100% through 4-in.

No. 1-A chips, No. 2-A chips and No. 3 concrete stone to remain as of 1930.

Registration

The following producers and guests were enrolled:

American Lime and Stone Co., Bellefonte, Penn., W. R. Cliffe and John Curtin.
J. E. Baker Co., York, Penn., S. W. Stauffer.
Berks Products Corp., Reading, Penn., G. H. Muth.
Bessemer Limestone and Cement Co., Youngstown, Ohio, Fred Hubbard.
Bethlehem Mines Corp., Bethlehem, Penn., M. L. Jacobs.
Carbon Limestone Co., Youngstown, Ohio, F. O. Earnshaw.
Chemical Lime Co., Inc., Bellefonte, Penn., H. D. Brigstocke.
E. I. du Pont de Nemours and Co., Narberth, Penn., E. T. Wolf.
John T. Dyer Quarry Co., Norristown, Penn., F. T. Gucker.
W. A. Frack, attorney, Easton, Penn.
General Crushed Stone Co., Philadelphia, Penn., H. B. Allen and John Rice, Jr.
Grove City Limestone Co., Sharon, Penn., H. J. Filer.
Lake Erie Limestone Co., Youngstown, Ohio, W. M. Andrews.
Lime Bluff Co., Muncy, Penn., C. C. Hartsook.
John P. Lockhart, attorney, New Castle, Penn.
National Limestone Co., Naginey, Penn., A. L. Sheffer.
New Castle Lime and Stone Co., New Castle, Penn., Ellwood Gilbert.
Pennsylvania State Highway Department, Harrisburg, Penn., C. H. Buckius, H. S. Mattimore, P. M. Tebbs and W. A. Van Duzer.
Pittsburgh Limestone Co., Pittsburgh, Penn., Alexander Chambers.
Reinhold and Co., Inc., Pittsburgh, Penn., P. B. Reinhold.
Steacy Wilton Co., Wrightsville, Penn., Hiram Nauss and F. F. Wilton.
Stowe Trap Rock Co., Philadelphia, Penn., N. Cascetti.
Trumbower Co., Nazareth, Penn., W. J. Santee.
Universal Atlas Cement Co., Pittsburgh, Penn., A. B. Wells.
Western Pennsylvania Sand and Gravel Association, Pittsburgh, Penn., R. V. Warren.
White Rock Quarries Co., Bellefonte, Penn., Ray C. Noll.
York Valley Lime and Stone Co., York, Penn., F. W. Cramer.

Transit-Mixed Concrete Manufacturers Convention

THE NATIONAL ASSOCIATION of Paris Transit Mixed Concrete Manufacturers will hold its annual convention at the Marquette Hotel, St. Louis, Mo., January 9-10-11-12, the Friday, Saturday, Sunday and Monday preceding the Annual Road Show in the same city.

Representatives of the National Sand and Gravel Association and the Portland Cement Association will address the convention. The association is composed of fifty operators of Paris Transit Mixer equipment in the United States and Canada. Transit Mixers, Inc., equipment manufacturers will be represented by its president, A. Knowles, and Hugh P. Paris, inventor of the Paris transit mixer, will also appear on the program. Development of this new industry during the past year and the most modern methods of manufacturing and delivering transit mixed concrete will be demonstrated by moving pictures.

The association has executive offices at Portland, Ore. E. A. Landis is executive secretary, and Porter W. Yett, Portland operator, is president.

Another Pittsburgh Ready-Mix Concrete Producer

SELLING READY-MIXED CONCRETE has developed into a large business in Pittsburgh, Penn. Among the recent installations is that of the D. J. Kennedy Co., Braddock avenue. This company uses Rex moto-mixers to mix and deliver the concrete.

The entire plant, consisting of elevator, bins and weighing devices which accurately proportion all materials, as well as a fleet of moto-mixers, was designed and furnished by the Hunter Machinery Co. This company is the local distributor for a group of leading construction machinery manufacturers.

The concrete in the new Millvale station of the Sun Oil Co. was delivered by the D. J. Kennedy Co. Three hundred and eighty-nine cu. yd. of concrete were poured in a large retaining wall. Three hundred and fifty yd. of this was delivered in a continuous pour in 26 hours' time.—*Pittsburgh* (Penn.) *Sun-Telegraph.*

New Florida Lime Plant to Make Solid Carbon Dioxide (Ice)

THE MIAMI LIME AND CHEMICAL CO. is a new industry for Miami, Fla. The manufacturing plant and related facilities for distribution are now under construction. The plant will produce lime, operations to begin January 1, and later a byproduct, solidified carbon dioxide gas will be placed on the market. Florida limestone, obtained from extensive deposits on a tract adjoining the plant of the company, will furnish the natural material from which the lime will be manufactured for the building trades. The limestone, otherwise known as Miami oölite, has been found to be of the highest quality and ideally adapted for conversion through special processes to be employed at the company's large kiln into either commercial quicklime or hydrated lime, suitable for plastering materials or stucco. In addition to commercial lime a high-quality chemical lime will be produced for which there are many uses such as water softening and purifying, and as an insecticide for spraying fruit trees, walls of buildings, etc.

Construction work on the various units comprised in the new lime producing plant was begun early in September this year. The shaft kiln, enclosed by a circular steel shell 11 ft. in diameter, 50 ft. high, and fired by twin furnaces lined with fire brick, is now nearing completion. The kiln will have a capacity of 15 to 18 tons of lime daily. An additional kiln will be erected by the company as soon as practicable after the first unit has been thoroughly tested out in operation.

Other buildings under construction and to be included in the factory group are the steam-generating plant, boiler room, where a 300-hp. boiler will be installed, and two storage buildings with a storage capacity of 100 tons each, also a large office building.

All the plant buildings will be of reinforced concrete and steel construction. Machinery for converting into marketable form for refrigerating purposes solidified carbon dioxide gas will be installed in a few months. Capt. Tom Newman, president of the company, said that a trade name for the product will be selected when facilities for its production in quantities are completed.

The area now owned by the company and the oölite deposits are estimated to be sufficient to supply the company's lime-producing requirements for 50 years or more.

The lime kiln is equipped with an inverted cone-shaped steel bottom which acts as a cooling chamber below the fire boxes. From this chamber the lime will be conveyed at intervals to the storage bins, located between the kiln and the railroad siding.

The total investment represented in the Miami Lime and Chemical Co. enterprise will be approximately $100,000.

The officers of the company are Capt. Tom Newman, president; Dann C. Squires, vice-president; J. F. Deihl, secretary-treasurer.

News of All the Industry

Incorporation

Central Premix Concrete Co., Spokane, Wash. W. M. Murphy, M. J. Burke and D. R. Heil.

The Union Sand and Supply Corp., Painesville, Ohio, $25,000.

Dickason Sand and Gravel Co. (Delaware corporation) filed affidavit concerning withdrawal from state of Indiana.

The Pulaski Corp., Little Rock, Ark., 400 shares of no par value common stock. C. M. Walser, E. G. Hale, J. W. Atkins. To produce cement products.

Denver Sand and Gravel Co., Kittredge Bldg., Denver, Colo., 25,000 shares of no par value. Frank A. Perry, P. Mailo and S. G. Ferraro.

Hat Island Sand and Gravel Co., Seattle, Wash., $50,000. Victor H. Elfendahl and Livingston B. Stedman.

New England Quarries, Inc., Boston, Mass., 5000 shares no par stock. John W. Moore and Ann R. Hanley, both of Boston, and B. J. Bruce of Newton, Mass.

Bay State Abrasive Products Co., Westboro, Mass., $150,000; 3000 shares at $50 each. President, Orello S. Buckner; treasurer, Leonard M. Krull, and Wallace W. Greenwood.

Farnam Cheshire Lime Co., Adams, Mass., $1000 consisting of 10 shares of common stock, par value $100 each. Walter J. Donovan, Adams, Mass.; Henry E. Heidel, Cheshire, Mass., and Thomas J. Curtin, Cheshire. President, Walter S. Underwood, Chicago.

Van Briggle Companies, Denver, Colo. Consolidation of the Van Briggle Art Pottery Co., Van Briggle Tile Co. and the Van Briggle Stone Co., capitalized respectively at $150,000, $100,000 and $50,000 in preferred stock. Each will have from 15,000 to 25,000 shares of common stock at no par value. To produce art stone, tile, pottery, and other products. I. F. and J. H. Lewis and W. C. Hoe.

Quarries

Raleigh, N. C. Nine prisoners sawed their way out of the Granite Quarry convict camp recently and escaped.

Darlington, Wis. A. C. Brunkow, contractor and road builder, has purchased from the city the old Dunbar quarry site and has erected a machine shed here, 25x210 ft., to accommodate trucks, crusher, bins and other equipment.

Auxvasse Quarry Co., Auxvasse, Mo., has resumed operations. The company has contracted with the state for from 10,000 to 12,000 tons of crushed limestone for use in paving work next year on Highway 43 in south Callaway county.

Lompoc, Calif. Plans for the construction of a rock crushing plant in Stewart Canyon, six miles southwest of this city, were announced recently by W. H. Webb of Santa Paula, Calif. The plant is to be erected on the Charles B. Lowry ranch and it is expected to be in operation by January 15.

W. I. Spangler, who operates a stone quarry west of Newville, Penn., has purchased the quarry plant of H. Vincent Hamilton of Newville. Mr. Spangler will operate both plants in conjunction with Elmer Kough, and with the acquisition of the new plant production of lime is to be carried on at a larger scale.

La Crosse, Wis. Work on the opening of quarries specified by the state highway commission on Highway 33, between Middle Ridge and Irish Hill, has been started. The Inter-State Construction Co. of Madison, Wis., was given the contract for quarrying the rock, following the opening of bids here several weeks ago. The contract calls for 8400 cu. yd. of rock.

Sand and Gravel

Palmer and Sayko, Mountain Home, Ida., has installed a large crushing plant to be used in crushing gravel for highway work on the Idaho Central Highway near Toll Gate.

Lyman-Richey Sand and Gravel Co. announces that its offices are now located in Suite 1140, Omaha National Bank Bldg., 17th and Farnam streets, Omaha, Neb.

Western Construction Co., Omaha, Neb., has leased the Thomsen gravel pits at Osmond, Neb., and is installing larger pumps, preparatory to furnishing gravel for numerous highway projects in northeast Nebraska.

Western Bridge Co. has been granted a right-of-way to the river at the northwest corner of Grant Buckley's farm west of Concordia, Kan. The company has made tests of the sand at that point and will begin taking it from the river next spring for commercial purposes. Mr. Buckley will receive 5 cents per cubic yard as a royalty. The company will ship its product from Ames, Kan.

Eastern Ohio Sand and Supply Co., Steubenville, Ohio, has leased a block of property in East Liverpool, Ohio, for a period of 10 years and has been granted permit to construct and operate a railroad single side track on the property from a point in the right-of-way of the Pennsylvania company at the east line of Jefferson street to a point at the west line of Golding street, East Liverpool.

The Stone Sand and Gravel Co., Dayton, Ohio, has filed suit against the Cleveland, Cincinnati, Chicago and St. Louis railway for damages amounting to $2520. The sand company claims that on October 22 a watchman at the East First street railroad crossing signaled a driver of one of their trucks to drive across and that when he did it the truck was struck and demolished by the locomotive. The company asks for $2200 damages to the truck and $320 claimed lost as a result of the truck being out of service 40 days at a rate of $8 per day.

Cement

Lone Star Cement Co., Kansas, has resumed operations at its Bonner Springs plant.

Pacific Coast Cement Co., Seattle, Wash., is circulating a very interesting folder which pictures various construction jobs on which the company's Diamond portland cement has been used.

International Cement Corp., New York City, is conducting a very convincing advertising campaign for its "Incor" Perfected High-Early-Strength Portland Cement. Mailing pieces calling attention to the advantages of this high-early-strength cement are being mailed to prospective customers at frequent intervals. The latest calls attention to the advantages of "Incor" for reducing construction costs.

Cement Products

Lock Joint Pipe Co. has a contract for 2000 ft. of concrete pipe for the Polk street storm sewer project at Topeka, Kan. The pipe is being made in two sizes, having diameters of 8 and 9 ft.

Miscellaneous Rock Products

The National Retarder Co., Chicago, Ill., has moved its offices to Room 1828 Merchandise Mart Bldg., Chicago, Ill.

Bloomington, Ida. Phosphate rock from the mines here is being routed to the new $10,000,000 plant of the Consolidated Mining and Smelting Co. at Trail, B. C.

International Agricultural Corp., New York City, has let contracts for improvements at its Mulberry, Fla., plant. The new improvements will consist of additional dryer and wet storage system, with accompanying conveyors and other equipment.

Personals

Harry Albert, formerly superintendent of the Arlington, Ohio, plant of the National Lime and Stone Co., has accepted a similar position at Lewisburg, Ohio.

B. H. Taylor, former general manager of the Pittsburgh Limestone Co., retired several months ago and is now living in California. **A. W. Worthington** is now general manager of the company.

B. F. Affleck, president of the Universal Atlas Cement Co., Chicago, Ill., is the chairman of the building industries group to raise funds for Governor Emmerson's commission on unemployment and relief.

Thomas W. Bacchus, vice-president of the Hercules Powder Co., Wilmington, Del., was the honored guest at a bon voyage dinner given by about 60 officers and members of the company on December 11. Mr. Bacchus is sailing with his family for a trip around the world.

L. E. Palmer, superintendent of the Wabash Portland Cement Co.'s Osborn, Ohio, plant, will address the next industrial safety meeting to be held January 15 under the auspices of the industrial safety committee of the Dayton (Ohio) Safety Council. The subject of Mr. Palmer's address will be "Plant Conditions."

E. M. Stevens, formerly with the Missouri Portland Cement Co., has succeeded **John McGuire** as vice-president and general superintendent of the Standard Building Material Co., St. Louis, Mo. Mr. McGuire, who has retired from business, has been active in the sand and gravel business for the past 35 years.

Manufacturers

The Brown Instrument Co., Philadelphia, Penn., has a very unique advertising novelty which is being distributed to anyone interested in flow meters. The novelty is in the form of a card showing two recording gages connected to their manometers, and by pulling a tab that is a part of the mechanism the principle of the Brown electric flow meter is more clearly demonstrated. The meter works on the inductance bridge principle.

General Electric Co., Schenectady, N. Y., has co-ordinated the various plastic activities of the company into one department known as the plastic department, and R. E. Coleman has been appointed manager of the new department with an advisory committee consisting of Vice-Presidents J. G. Barry, W. R. Burrows and C. E. Eveleth. The new department will be responsible for sales, engineering and manufacturing of plastics and involves activities at the Pittsfield, Schenectady, Fort Wayne, Erie and Lynn (River) plants of the company.

The Byers Machine Co., Ravenna, Ohio, has recently appointed the Belzer Machinery Co., Portland, Ore., as distributor of its line of excavators, shovels and draglines in western Oregon and Washington. Coincident with this announcement, R. L. Belzer, head of the Belzer Machinery Co., has announced the appointment of H. L. Niles as a member of his selling organization, to specialize in the introduction of the new equipment in this territory. Mr. Niles was formerly Northwest manager for the Marion Steam Shovel Co., which firm is also represented by the Belzer Machinery Co.

The New Jersey Wire Cloth Co., Trenton, N. J., announces that on and after January 1, 1931, the corporate existence of that company will cease and the business be continued by the John A. Roebling's Sons Co., of which it is a subsidiary. The sale and distribution of wire cloth, wire netting, wire fence, wire lath and wire work will be continued through the parent company at Trenton and through the Roebling branches. The Roebling company will assume all the contracts and obligations of the New Jersey Wire Cloth Co., while the same personnel will continue the manufacture and sale of the entire line.

Lincoln Electric Co., Cleveland, Ohio, announces that changes in the personnel of the Pacific Coast offices of the company include the appointment of S. H. Taylor, Jr., to succeed W. S. Stewart in charge of the Coast, with headquarters at 812 Mateo St., Los Angeles, Calif. Mr. Stewart has recently been appointed district manager of the Cleveland territory of the company. Appointment of L. P. Henderson as manager of the San Francisco office of the company is also announced, as well as the appointment of E. J. Pfister, formerly of the Philadelphia and Allentown offices, to district manager of the Kansas City district, with offices at 405 R. A. Long Bldg., 10th and Grand Sts., Kansas City. The Philadelphia office, in charge of D. C. Anderson, has also been moved to the Commerce Bldg. in that city.

Fuller Lehigh Co. is to transfer its manufacturing operations from Fullerton, Penn., to the Barberton, Ohio, works of the Babcock and Wilcox Co. Management, engineering and sales departments will move to New York City. No definite date has been set for these changes, but it is expected that they will be made early in 1931. The corporate identity of the Fuller Lehigh Co. will be maintained, according to an official announcement, but in some cases the personnel will be merged with that of the parent company, the Babcock and Wilcox Co. Sales offices of the two companies are now located close to each other, and the erection and service departments of the two concerns have been combind for some time. E. G. Bailey, president of the Fuller Lehigh Co., has been elected a vice-president of the Babcock and Wilcox Co.

Continental Motors Corp.'s salaried executives have developed a unique plan for the relief of employes faced with the problems incident to unemployment and failure of income. Acting on their

own initiative, this group individually pledged the payment of a certain sum each month for a period of five months to a fund designated as the Continental Motors Corporation Good Will Fund, its administration to be in the hands of a small committee at each plant, which was directed to investigate each case where relief appeared necessary, and empowered to take such remedial action as appeared warranted. An invitation was extended to all salaried employes to participate, but it was emphasized that all contributions should be on a wholly voluntary basis. The results were immediate and gratifying. The board of directors of the corporation also voted to assist the fund at both plants with a substantial monthly contribution, the aggregate of all monthly contributions providing a substantial amount for the direct relief of employes of the corporation in need of assistance.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention Rock Products.

Air Separator. Folder describing the Raymond mechanical air separator, its adaptability, operation and construction. RAYMOND BROS. IMPACT PULVERIZER CO., Chicago, Ill.

Gasoline Powered Hammer. Folder describing the Rodax portable gasoline driven hammer for tamping, concrete breaking, frost breaking, sheeting driving, etc. RODAX CORP., 2199 Lumber St., Chicago, Ill.

Locomotives. Three locomotives—one a 30-ton chain and side rod drive, the second a 20-ton oil-electric, and the third a 20-ton full gear and side rod drive—are described in a new folder of GEO. D. WHITCOMB CO., Rochelle, Ill.

Motor Starters. Folder describing a new 2300-volt motor starter for full voltage starting of squirrel-cage and synchronous motors and for primary control of slip-ring motors. THE ELECTRIC CONTROLLER AND MANUFACTURING CO., Cleveland, Ohio.

Grinding Mills. New folder describing Traylor 3-compartment grinding mills as used in cement plants for the production of high-early-strength portland cement. TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

Nickel Alloy Steel Products. The 1930 Fall Issue of the Buyers' Guide, a directory of manufacturers, fabricators and distributors of nickel alloy steel products, has just been issued by THE INTERNATIONAL NICKEL CO., INC., New York City.

Weight Feeders and Coal Pulverizers. The Hardinge Constant Weight Feeder, which is claimed to eliminate all variations in feed due to specific gravity, and the Hardinge unit coal pulverizer for firing cement kilns, are described in a new folder of the HARDINGE CO., York, Penn.

Convertible Machine. Bulletin **No. FBE-10201** covering Bucyrus-Erie's 1020 ½-yd. convertible clamshell, lifting crane, shovel, dragline and dragshovel, the smallest of the company's line, and which may be had with gasoline, Diesel or electric power plants. BUCYRUS-ERIE CO., South Milwaukee, Wis.

Screens. Folder on the MOGUL Gyrex Screen, designed to do as high as 6-in. screening and to handle in the feed pieces ranging up to 20 in. Recommended for use in following the primary crusher in crushed stone plants and as a scalping unit ahead of the secondary crushers. ROBINS CONVEYING BELT CO., New York City.

Centrifugal Vibrating Screen. Bulletin **No. 1470-A,** a revised edition of a previous bulletin on centrifugal vibrating screens for screening and sizing lump and granular substances such as crushed stone, all kinds of coal, and materials of this nature, of various sizes, either wet or dry. Made in sizes to suit conditions of service. ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wis.

Locomotives. Bulletin **B-27** on the "IB" series of locomotives, in 4½, 5, 6, 8, 10 and 12 tons, contains information and tables helpful in selecting the particular weight and type of locomotive best suited for any particular operating duties, as determined by load, grade, track, curves, car friction, etc. BROOKVILLE LOCOMOTIVE CO., Brookville, Penn.

Inspection Work. "The Protective Value of Independent Inspections" is the title of a very attractive and handsomely illustrated booklet just issued by the Pittsburgh Testing Laboratory covering their independent inspections for the purpose of rendering unbiased reports as to the exact kind, quality, condition, dimensions or other physical or chemical properties of products. PITTSBURGH TESTING LABORATORY, Pittsburgh, Penn.

Dust Collecting. Bulletin **No. 40,** a reprint of an article in Industrial and Engineering Chemistry by W. H. Gabeler on "Dust Control in Phosphate Rock Grinding," telling how dust-free operating conditions were obtained at the Baltimore plant of the Davison Chemical Co. with air filters handling excess air from cyclone separators. THE DUST RECOVERING AND CONVEYING CO., Cleveland, Ohio.

Mine Foremanship. A 38-page booklet entitled "Mine Foremanship" which is a compilation of seventeen lectures on the essential qualities necessary in successful foremanship by Dr. J. J. Rutledge, chief mine engineer, Maryland Bureau of Mines. These articles appeared successively as a monthly study series in The Explosives Engineer magazine, and are now published in booklet form. HERCULES POWDER CO., Wilmington, Del.

Underfeed Stoker. A new 28-page catalog describing the Type E underfeed stoker, applicable to boilers ranging from 150 hp. up to 600 hp., and recommended for burning either coking or non-coking bituminous coals and for various refuse fuels. The catalog includes line drawings showing suggested application of this stoker to various types of boilers, a list of representative installations, and test data. COMBUSTION ENGINEERING CORP., New York City, N. Y.

Chains. Book **No. 1050,** a 32-page comprehensive data book devoted to chains made of Promal metal, Link-Belt's new, strong, long-wearing metal for cast chains, for power transmission and conveying services. The new book describes Promal chains, both plain link and attachments, for use where the inherent qualities of this new metal are desired. Dimensions, strengths, list prices and weights are given in this data book. LINK-BELT CO., Chicago, Ill.

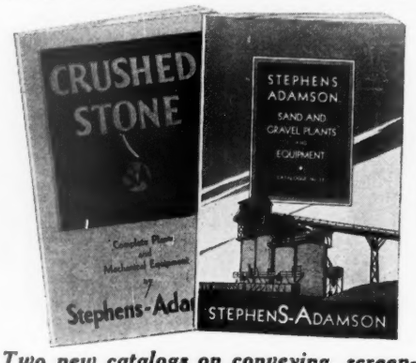
Welding Accessories. New catalog of Fuzon welding accessories, including cable, carbon electrode holders, metallic electrode holders, goggles, lens and coverglass, helmets, handshields, lugs and connectors, gloves and scratch brushes. The book also illustrates and describes carbon and graphite electrodes, "Weldite Fillet" putty and "Weldite" welding rods, and is a handy guide for ordering electric arc welding accessories and supplies. FUSION WELDING CORP., Chicago, Ill.

Pumps. Bulletin **No. 126,** featuring "Chicago" Non-Clogging Pumps for sewage disposal plants. This is the first of two new bulletins on pumps and discusses open-shaft pumps. It gives a short treatise on the necessity for sewage treatment works, written so that the layman or uninitiated in sewage treatment practice can comprehend the necessity of sewage treatment and the part a centrifugal pump plays in sewage handling and treatment. CHICAGO PUMP CO., Chicago, Ill.

Portable Belt Conveyors. Folder **No. 1248** covering portable belt conveyor with channel frame and Timken bearings. Used as a stationary conveyor without the supporting wheels, overhead frame, chain block or bail; adapted as a shuttle conveyor, for which purpose rollers are placed near each end of the conveyor; used for horizontal conveying with the conveyor frame resting directly on axle, and for numerous other applications in sand and gravel pits, etc. LINK-BELT CO., Chicago, Ill.

Speed Reducers. Catalog **No. 102,** giving complete information on the new IXL Titan helical gear speed reducers, having heat treated and hardened gears; also on the IXL Titan herringbone speed reducers, both units now being equipped with anti-friction bearings. A new rating method is used for showing horsepowers, inch-pounds torque, slow speed and high speed r.p.m.'s. FOOTE BROS. GEAR AND MACHINE CO., Chicago.

Conveying, Screening and Washing Equipment. Two new catalogs, as illustrated here, featuring conveying, screening and washing equipment, one for sand and gravel and the other for stone crushing plants, have just been issued. Each book contains about 75 pages and specializes in recent developments in plant arrangements and units for handling and producing material in the simplest and most economical way. Typical layouts are shown for plants of different sizes and processes, ranging all the way from the simple dry screening plant up to the large crushing, screening and washing plants equipped for storing, reclaiming and loading as high as two or three thousand tons an hour. A section in each book contains an interesting description of self-unloading freight boats. STEPHENS-ADAMSON MANUFACTURING CO., Aurora, Ill.



Two new catalogs on conveying, screening and washing equipment

Flexible Couplings. Bulletin **No. 111** introducing the medium duty type model added to the Poole flexible coupling line. According to the manufacturer, this new coupling has the same general refinements incorporated in the standard heavy-duty types, has been designed to meet requirements for a less expensive model for light and medium duty service, and has been found particularly adaptable to drives such as pumps, fans, small compressors, small generators, blowers, conveyors, elevators, and all types of light or medium duty machinery. THE POOLE ENGINEERING AND MACHINE CO., Baltimore, Md.

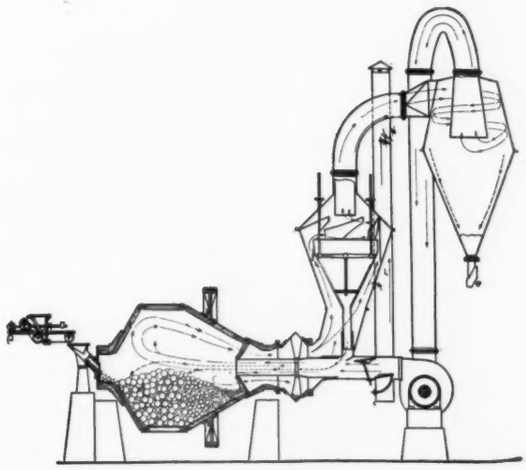
Power Shovel. Bulletin **No. 53** on the full-revolving Star Power Shovel, mounted on full-length crawlers, using gas or electricity, and with all levers and parts designed for easy handling. According to the description, with grader and bank bucket it clears trucks 19 ft. out and dumps at 17 ft. elevation in clear. With trencher or sub-digging scoop using the "pull to" stroke it digs to a depth of 18 ft. and will make excavation 22 ft. to 30 ft. wide at one setting. It can be equipped for use as a full-revolving crane; boom furnished 19 ft. to 30 ft. long; uses clamshell—½-yd. capacity for digging, ¾-yd. for rehandling material. THE STAR DRILLING MACHINE CO., Akron, Ohio.

Pumps, Turbines, Compressors and Speed Reducers. The equipment mentioned for use in the oil industry is described in a 40-page publication. Power and pumping units specially designed to meet the requirements of the oil industry are illustrated. The publication also contains chapters on the characteristics of centrifugal pumps when handling oil and other viscous liquids, on different hydraulic systems of balancing centrifugal pumps, on the effects of skin friction of impellers, and on the influence of the number of stages upon efficiency. Various formulas and tables of use to engineers and others are included. DE LAVAL STEAM TURBINE CO., Trenton, N. J.

Rock Drills and Portable Hoists. Bulletin **No. 87-D** on the Sullivan "L-6" rotator rock drill, a one-man drill, weighing 58 lb., intended for all-round service in conditions where a mounting is not required, such as bench drilling, shaft sinking, open cut work, quarrying, etc. Bulletin **No. 76-M** on "Turbinair" portable hoists, built in a number of sizes and types, including single drum with 3-hp. and 7½-hp. motors, as well as double drum units for scraper loading and similar purposes. The bulletin shows numerous applications of the hoists, not only in mining and construction, but in a great variety of other industries. Bulletin **No. 76-L** on the Sullivan "Turbinair" cathead, operated by compressed air or steam, and adapted for a considerable range of handy uses in mining, construction and general service where loads can be handled with a loose rope in either hoisting or hauling work. SULLIVAN MACHINERY CO., Chicago, Ill.

Steel Flooring. Engineering data sheet illustrating and describing Irving specialties, including open steel flooring constructed with the patented "Streamline" splice for joining individual fabricated flooring units in a continuous steel mesh floor of any desired shape or area; the Irving "Unified" Bridge Floor System, which combines a system of floor slab reinforcement with surface armoring, employing a lower (tension) mesh structure as reinforcement and armoring, the two being united by shear members of steel; bridge floor, tunnel and highway armoring, which may be used either with concrete or with any of the well-known plastic (asphaltic) road materials. According to the description, it becomes an integral and permanent part of the roadway surface, affording a continuous steel structure to carry the traffic loads and shocks and wear, with the filling material serving merely to level out the surface for drainage. Dimensions, list prices and other data are given. IRVING IRON WORKS CO., Long Island City, N. Y.

Mining, Quarry and Gravel Plant Machinery. Bulletin **No. 266-G** describing the Telsmith pillar-shaft type primary breaker; jaw crusher with both frame and swinging jaw of steel; reduction crusher with umbrella-shaped head designed for secondary crushing; the Telsmith standard screen designed for large capacity; Telsmith-Hercules screen; Telsmith-Ajax gravel washer for the removal of extraneous matter not soluble in water; Telsmith-Hercules washer equipped with anti-friction roller bearings; Telsmith Standard washing screen, a cylindrical screen combining the washing and screening operations in a single drum; log washer for washing either gravel or crushed quarry products; improved tilting type sand settling tank; sand drags; screw rewasher designed to supplement the Telsmith sand tank in pits where the sand contains so much dirt or fine sand that satisfactory results are not obtainable with a gravity tank; double-deck balanced vibrator, an inclined screen vibrated mechanically by opposed eccentrics; single-deck vibrator; belt and chain elevators, belt conveyors, etc. SMITH ENGINEERING WORKS, Milwaukee, Wis.



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in Closed Circuit with Air Classifiers

Raw mix ground in closed circuit with Hardinge Air Classifiers has proved superior to that ground in open circuit.

This is logical, since closed circuit grinding gives you a classified product, uniform in composition. The thorough mixing and blending which the material undergoes in the mill and air classifier in a closed circuit grinding system has resulted in a distinct increase in kiln capacity, since the chemical combination in the kiln is speeded up.

The Hardinge system is capable of grinding as fine as 98%-99% minus 325 mesh. Power consumption per ton of material ground is low. One mill reports a total consumption of 14.0 k.w. hours per ton, grinding to 90% minus 200 mesh. Another, working on different rock, is using 14.8 k.w. hours per ton, grinding to 89% minus 200 mesh.

In the Hardinge system, the material under treatment does not pass through the fan, thus avoiding serious wear on fan blades and casing.

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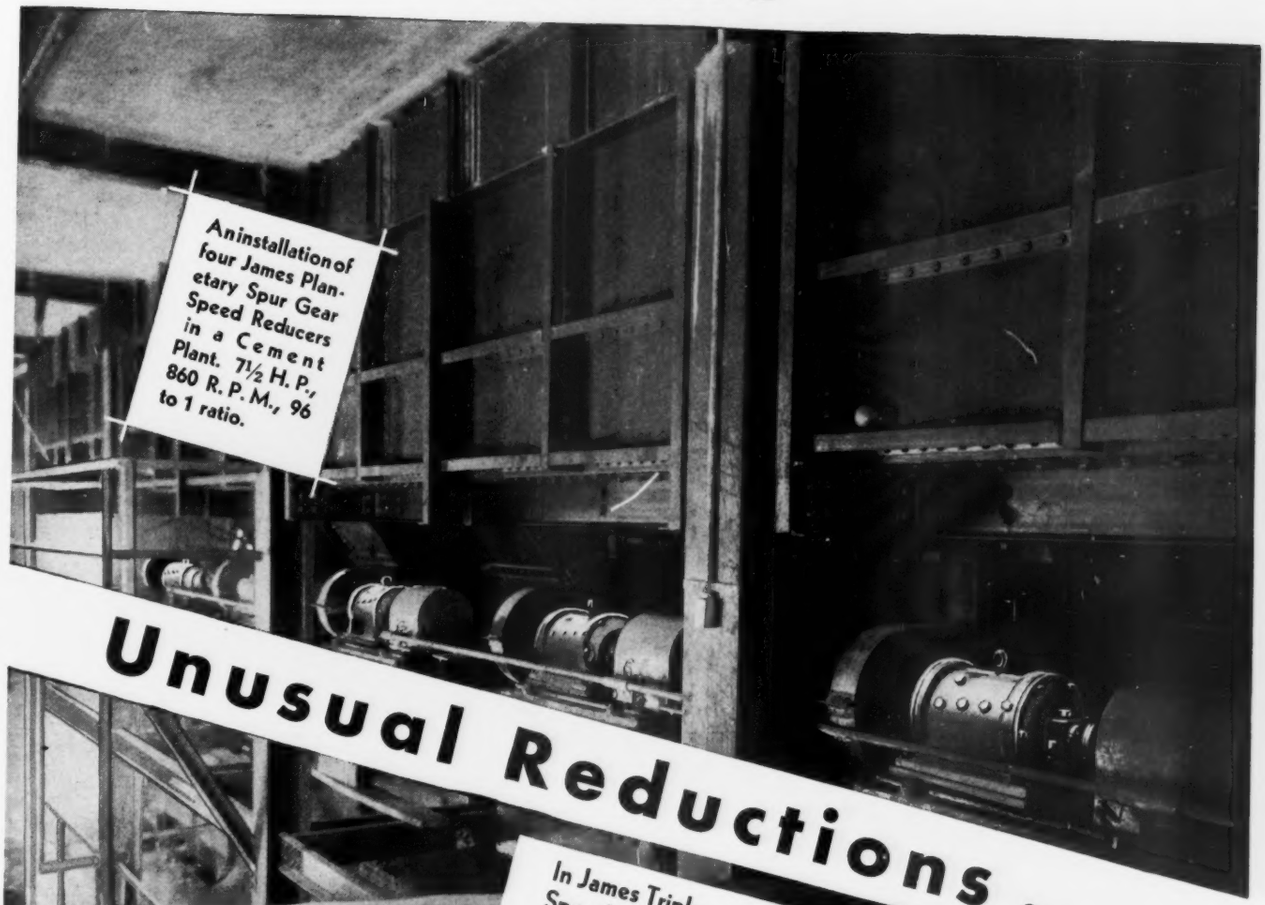

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In James Triple and Quadruple Planetary Spur Gear Speed Reducers it is possible to obtain unusual reductions in one reducer—eliminating costly combination units and extra couplings, installation and maintenance expenses, and saving space. And James Reducers do everything their ratings promise, for they are guaranteed to operate at 25 per cent constant overload and 100 per cent momentary overload—a factor of safety unique with James Speed Reducers.

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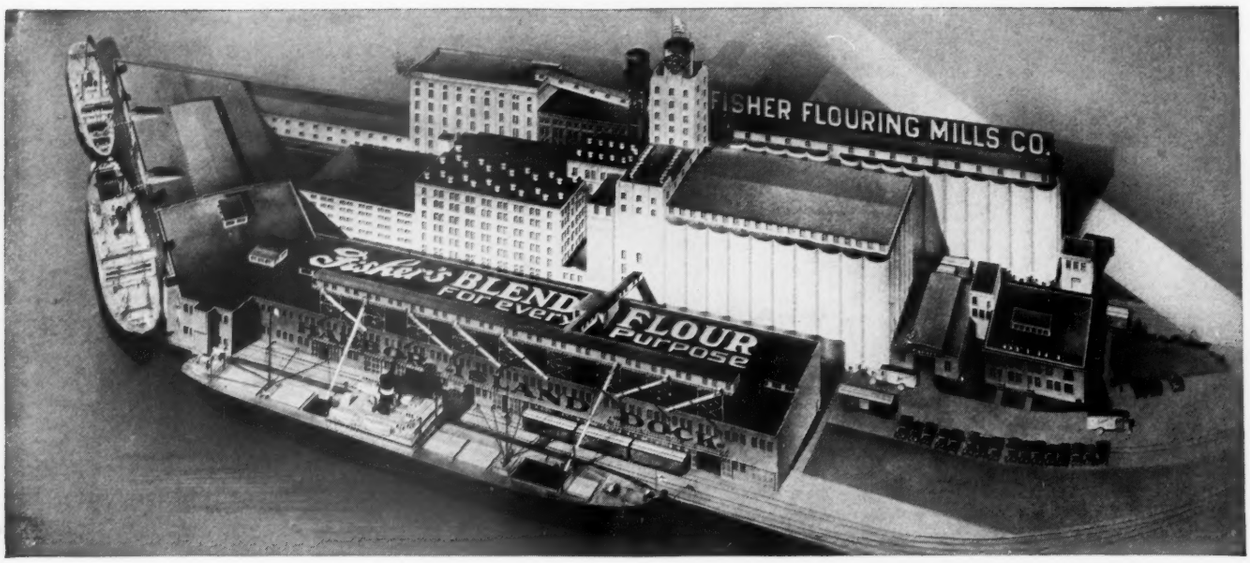
Make us your headquarters for cut gears and speed reducers. Our unequaled facilities and enormous stocks of finished speed reducer parts allow for quick shipment of many sizes. Only James makes all types of speed reducing units—the correct machine for every drive.



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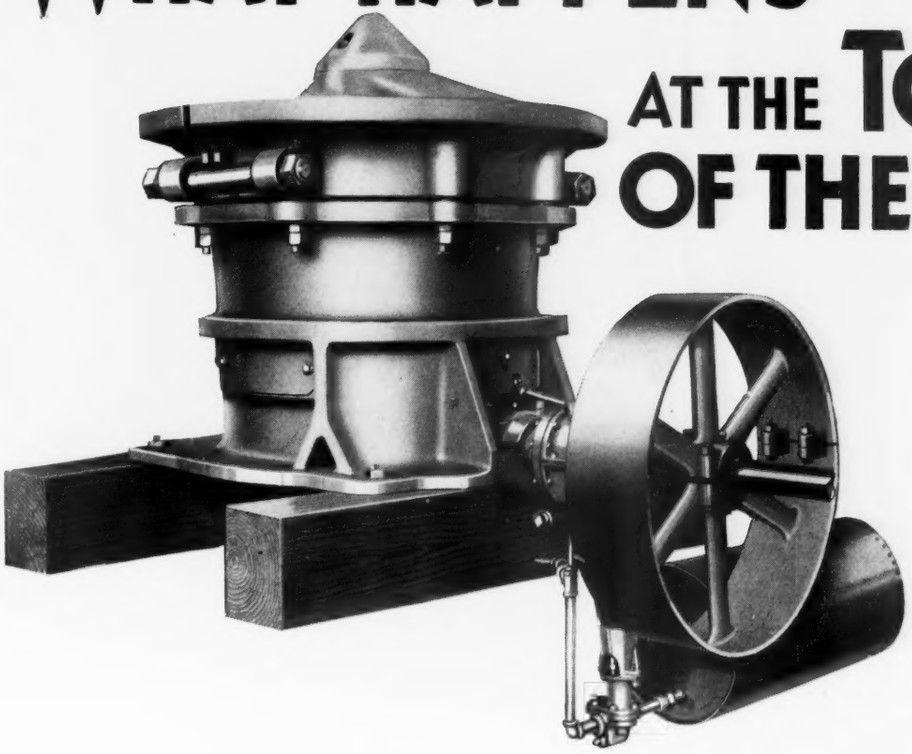

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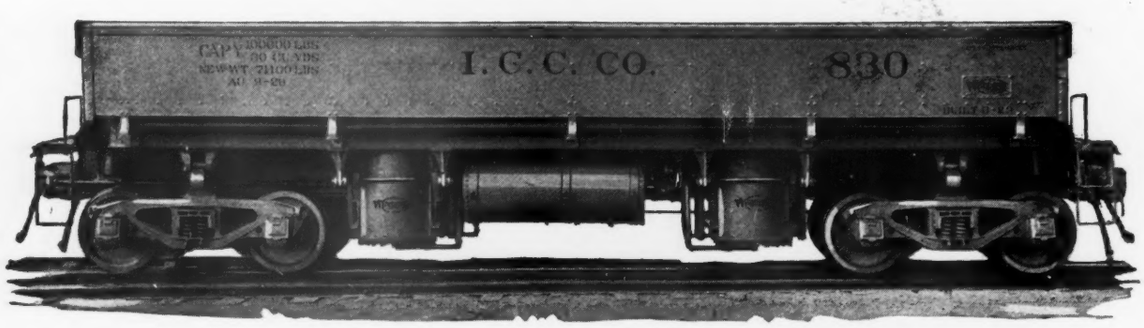

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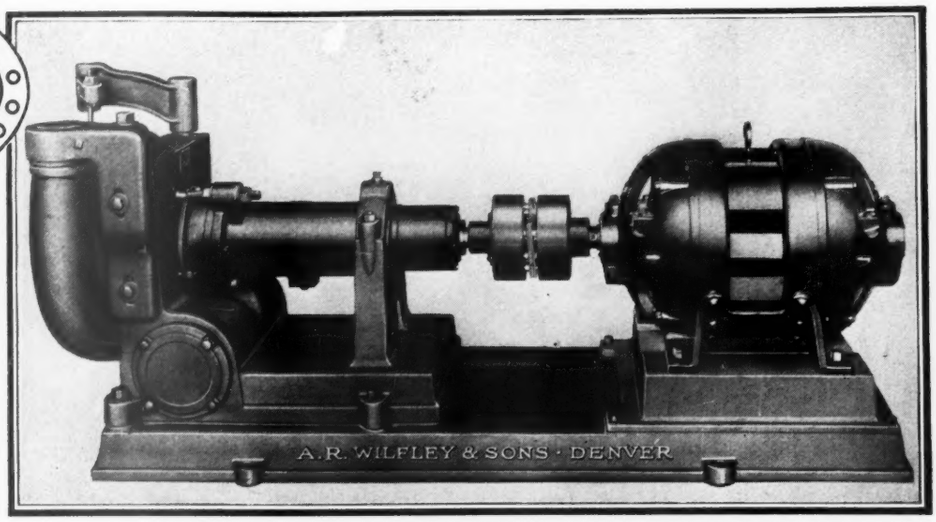

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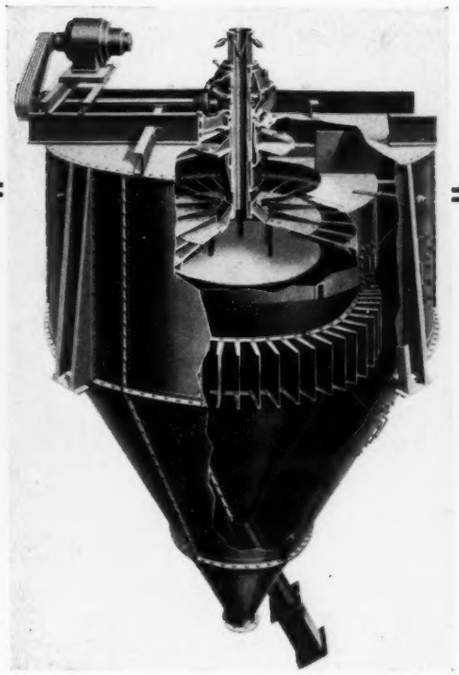

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finished product to a fineness of 91% passing 200 mesh

In a Dakota Plant two 10 foot Raymond Mechanical Air Separators are in closed circuit with two Centripact Pulverizers, grinding a clay for bleaching and filtering purposes.

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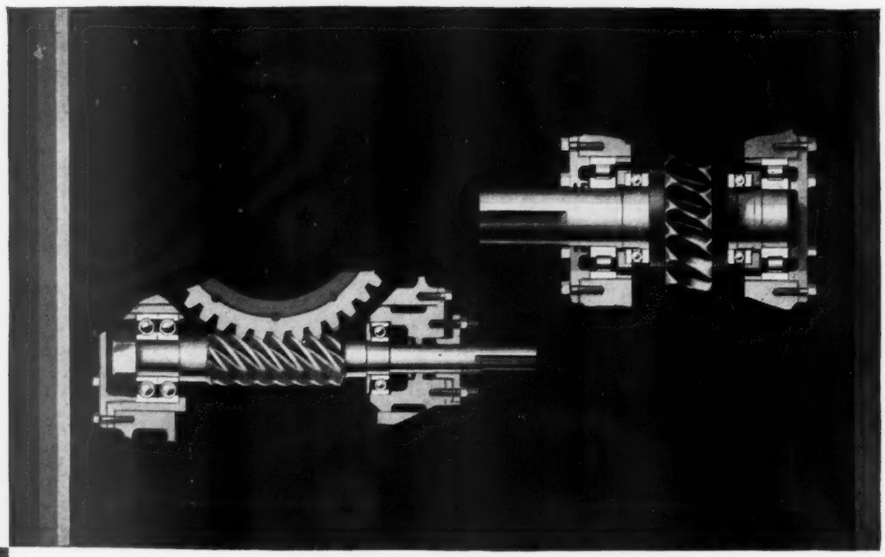
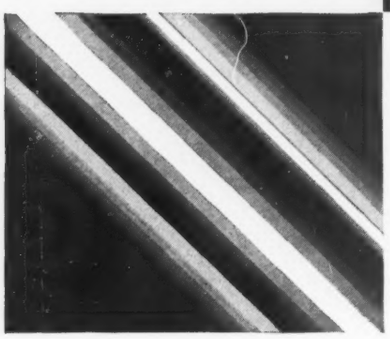
New York

Subway Terminal Bldg.
Los Angeles



Before . . you buy a speed reducer ask about its bearings



"As good as its bearings," applies to no machine more aptly than a speed reducer.

Sudden shocks . . . unavoidable overloads . . . stresses and strains not anticipated are certain to arise in any power transmission system. And when the crisis comes, engineers want bearings they can depend upon.

In Cleveland Worm Gear Units, they find the **FINEST ANTI-FRICTION BEARINGS THAT MONEY CAN BUY.** Balls and rollers combined carry every radial and thrust load imposed by passing power . . . bearings that hold worm and worm gear in accurate alignment . . . reducing wear to a minimum . . . assuring maintenance of original efficiency throughout the operating life of the unit.

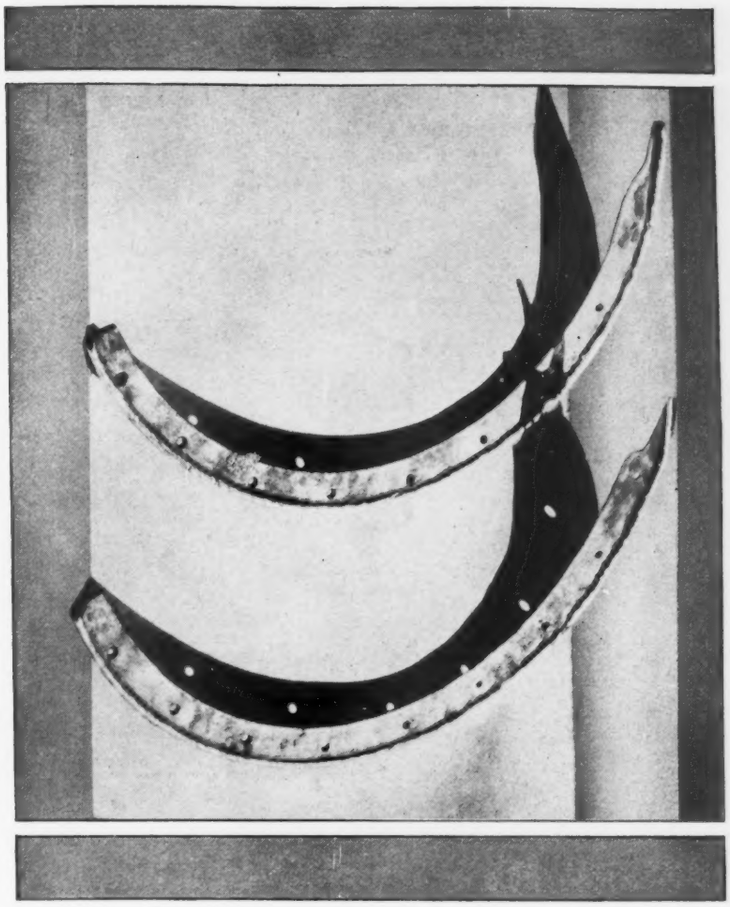
You may never have occasion to load Cleveland Worm Gear Speed Reducers to the limit. But it is comforting to know that the reserve capacity is there and that your speed reducer bearings will carry an emergency load many times in excess of their rating.

CLEVELAND
WORM & GEAR COMPANY
3272 EAST 80th STREET . . . . CLEVELAND, OHIO

CLEVELAND WORM GEARING—THE ULTIMATE DRIVE

When writing advertisers, please mention ROCK PRODUCTS

Getting the most out of wearing strips with HAYNES STELLITE



As a specific example of the proved economy of Haynes Stellite, a leading brick manufacturer submitted full data on Wearing Strips for a twenty-seven-inch Auger used in a brick machine. The report reads: "Formerly, the life of cast steel wearing strips averaged 6 weeks . . . with the use of Haynes Stellite applied to the wearing edges, at least 18 weeks are assured. The photograph shows Haynes Stellited strips after a run of 42 days. These strips are good for approximately 66 days more before replacement will be necessary."

Haynes Stellite has been adopted as the standard hard-facing material on a multitude of machine parts throughout the industrial field and has been a vital factor in the reduction of maintenance costs.

Investigate Haynes Stellite — the alloy possessing 75 per cent more Red Hardness, and therefore longer life, than any other hard-surfacing metal.

Haynes Stellite Company, Kokomo, Indiana RP—12-20-30

Without obligation on my part, please send me your new book, "Properties of Haynes Stellite."

Name .....

Company ..... Position .....

Street Address .....

City ..... State .....

HAYNES STELLITE COMPANY

Unit of Union Carbide UCC *and Carbon Corporation*

CHICAGO DETROIT LOS ANGELES SAN FRANCISCO
CLEVELAND HOUSTON NEW YORK TULSA

General Offices and Works— Kokomo, Indiana

Haynes Stellite Welding Rod is also available from any of the 42 shipping points of the Oxweld Acetylene Company

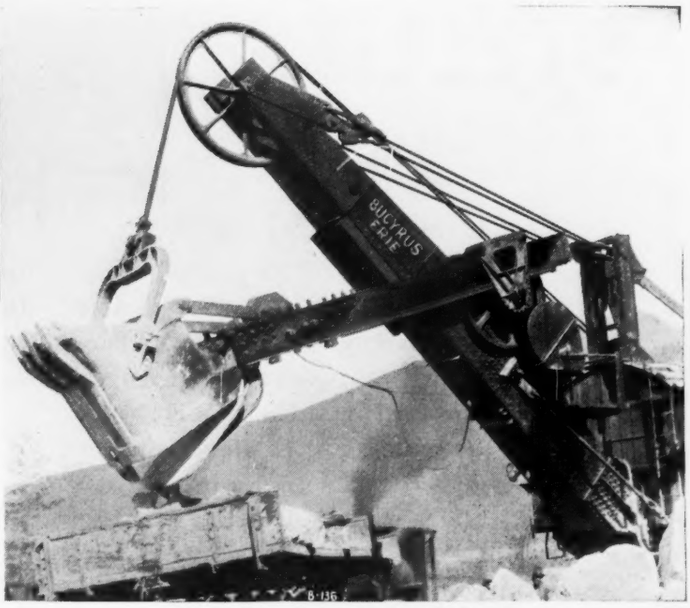
HAYNES STELLITE · HAYSTELLITE · HASCROME · HASTELLOY

Quality Products, Fair Prices, Dependable Supply, Engineering Service

HAYNES STELLITE TRADE MARK

When writing advertisers, please mention ROCK PRODUCTS

MILLIONS of TONS from this rugged front end without a maintenance delay



4-yard Bucyrus-Erie 120-B shovel

Take a second look at this boom and you'll see one reason why Bucyrus-Erie owners report year after year of steady output. These rugged shovels have a front end of proved ability to resist the shocks of hard digging and the twisting forces of fast swinging.

The boom is a deep, wide box-girder, corner welded — strength, without excess weight. It resists stresses as a unit, since the out-side dipper sticks bear only on the big, stationary shipper-shaft and do not tend to spread the boom.

These features mean uninterrupted operation and freedom from trouble. Owners have learned from experience to expect these advantages of Bucyrus-Erie shovels. Two, 2 1/2, 3, 4, 5-yards.

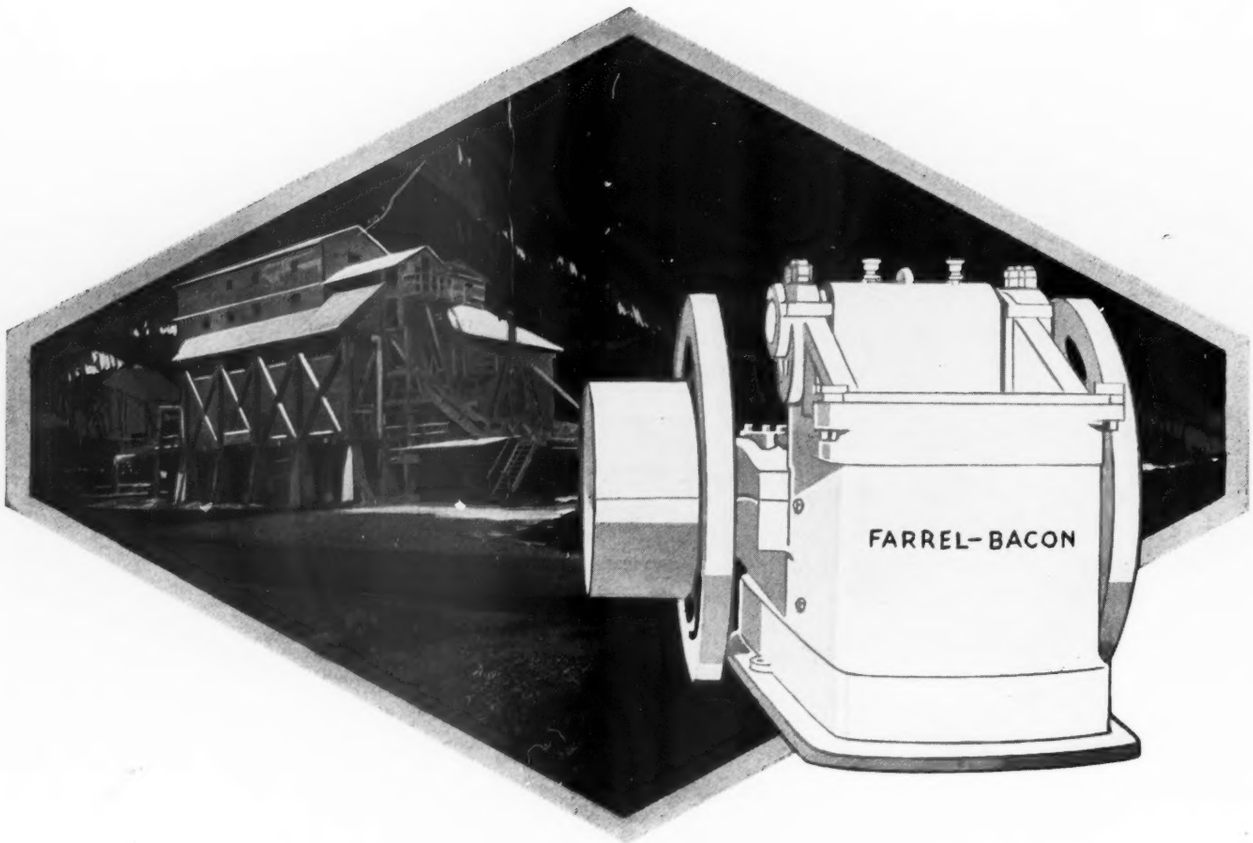
A card will bring specifications.

A-215—12-20-30—RP

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY, South Milwaukee, Wis. Offices or distributors in principal cities.

When writing advertisers, please mention ROCK PRODUCTS



1930 Remodeled Plant of Rowe Contracting Co., *Malden, Mass.*

A Model Plant Designed and Equipped by Earle C. Bacon, Inc.

In the Spring of 1930, the Rowe Contracting Co., Malden, Mass., users of Farrel-Bacon equipment for over 30 years, remodeled their plant from plans submitted by Bacon Engineers installing a 42″ x 40″ Style E Farrel-Bacon Crusher, Bacon screens, elevators and conveyors. After a season's operation, their judgment in the choice of equipment and engineering has proved correct by the increased production at decreased costs.

This is the SIXTH installation of the Farrel-Bacon 42″ x 40″ Style E which Bacon Engineers have made during the past 11 months.

This crusher is the ideal Breaker-Secondary type with exceptionally deep frame. Capacities, 2000 tons to 6 inches; 1500 tons to 4 inches, ten hour day. Weight, 116,000 lbs.

Let us plan for your requirements.
Illustrated Catalog sent on Request.

FARREL-BACON CRUSHERS

EARLE C. BACON *Inc.*

Engineers to the Stone Crushing Industry

26 CORTLANDT ST., NEW YORK, N.Y.

When writing advertisers, please mention ROCK PRODUCTS

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GYREX Screens are available in four sizes—3½′ x 6′, 4′ x 8½′, 4′ x 10′, 5′ x 10′. These may be had in single or multiple deck.

"The capacity of the screen is higher than was anticipated . . ."

THIS comment, by a prominent user* of the GYREX Screen, touches upon one of its outstanding advantages.

High capacity! And for these reasons:

1. the motion—a circular orbit—coupled with a selection of stroke and speed to suit the material to be handled, thus eliminating blinding.
2. the entire screening surface vibrates uniformly. There is no gradation from maximum to minimum intensity over the surface.
3. the load is kept evenly distributed by the arching of the screening surface.

If you are interested in high capacity screening, you will be interested in the Robins GYREX Screen.

ROBINS CONVEYING BELT CO.

NEW YORK CHICAGO

Boston Philadelphia Pittsburgh

London, England Johannesburg, South Africa

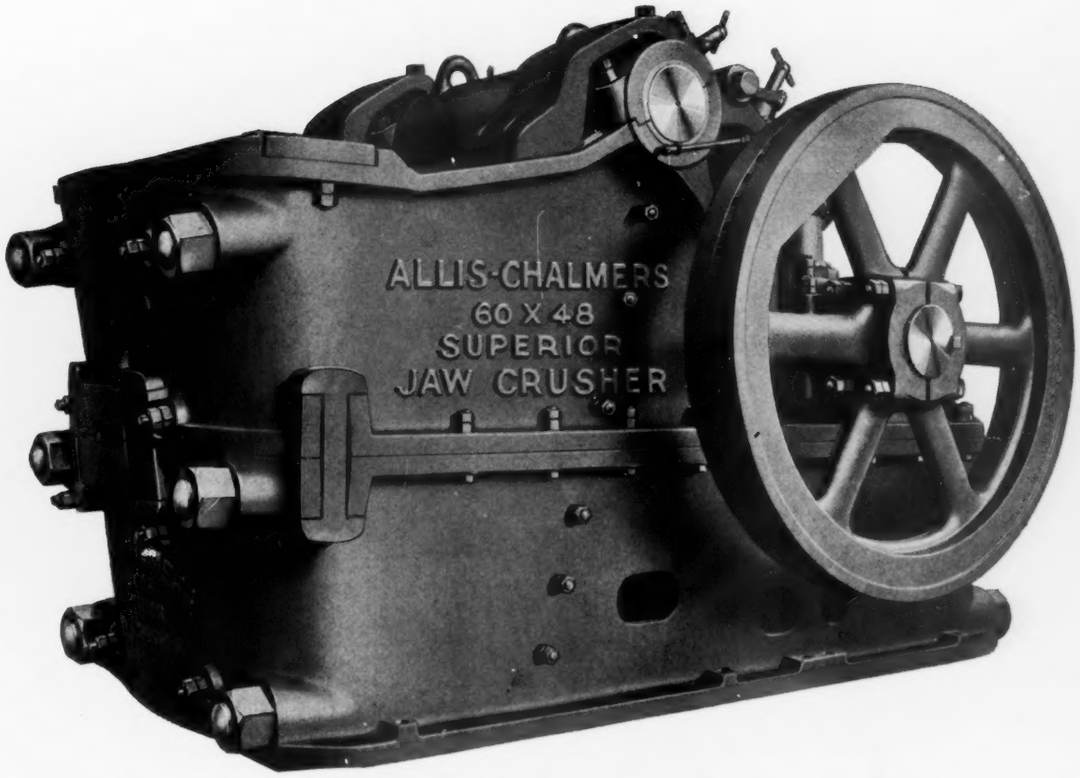
Representatives:

Birmingham	*C. B. Davis Engineering Co.*
Picher, Okla.	*Ore Reclamation Co.*
El Paso (For Mexico)	*Ammex Equipment Co.*
New Orleans	*A. M. Lockett & Co., Ltd.*
San Francisco	*Joshua Hendy Iron Works*
Salt Lake City	*The National Equipment Co.*
Seattle	*B. F. Easterbrooks Co.*

*Name upon request.

MATERIAL HANDLING ROBINS EQUIPMENT

Conveying and Elevating Equipment
Sizing and Screening Equipment
Stocking and Reclaiming Systems



Superior Jaw Crushers

SUPERIOR JAW CRUSHERS are the result of over 50 years of crusher designing experience, combined with the most modern manufacturing facilities. The frame is semi-steel reinforced with large forged steel tension rods shrunk in place; for sizes larger than 60x48 in. the frames are cast steel and tension rods are optional, depending on the service. The success of this tension rod construction is evidenced by the fact that no Superior Jaw Crusher Frame of this construction with the rods shrunk in place has failed. Pitmans and swing jaws are cast steel in all sizes. Jaw plates are reversible. Lubrication has received the most careful consideration. This rugged construction has resulted in low operating costs even under the most severe operating conditions. Superior Jaw Crushers are built in various sizes, 15x10 in. to 84x66 in.

Allis-Chalmers Products include complete equipment for crushing, screening and cement plants:—jaw, gyratory and roll crushers, rotating and vibrating screens, multi-roll sizers, washing equipment, and motors, pumps and drives. Write for a bulletin on Allis-Chalmers crushing plant equipment.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

When writing advertisers, please mention ROCK PRODUCTS

HABIT . . . *can be* a brutally expensive Luxury

Old habits can be as comfortable as an old pair of shoes—and yet be knocking holes in your bank account.

If there was ever a time when old habits need be stripped bare of all sentiment and put under the cost-microscope, it is right now.

Quarry shovels, for instance.

Is size and poundage the big factor in efficiency, or just a habit

?

Can one bulky brute of a shovel actually outdig the number of smaller shovels, which the cost of one big fellow would provide

?

Ton for ton do you KNOW the comparative costs of each method

THE THEW SHOVEL CO.
LORAIN OHIO

Thew Lorains have proven their ability to cut the cost of digging rock in quarries all over the United States. Send the coupon for the complete details.

THE THEW SHOVEL CO.
Lorain, Ohio

I am interested in facts and figures on quarry shovels.

Name

Address

LORAIN-45 LORAIN-55 LORAIN-75

When writing advertisers, please mention ROCK PRODUCTS

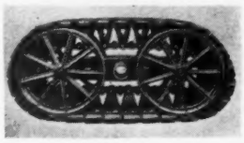
Only IN ATHEYS

DO YOU GET THE ENGINEERING REFINEMENTS

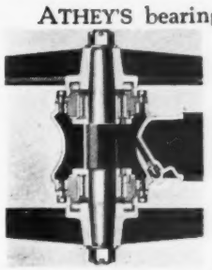
that mean LONGER LIFE AND LOWER MAINTENANCE

WHEN you put an ATHEY 3-Way Dump Trailer on your job, you have equipment that is as capable of giving uninterrupted service, long life with minimum maintenance, as human ingenuity can make it.

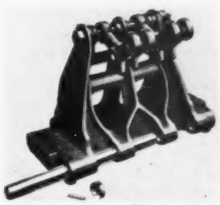
Over 75,000 ATHEY TRUSS WHEELS have seen service in all parts of the world, under every conceivable condition. They've been carefully studied—refined—tremendously strengthened—until today they offer more strength and stamina than any other equipment you can buy.



The ATHEY TRUSS WHEEL is a self-cleaning tracklaying wheel. It will operate under all soil conditions. Its simple, sturdy construction provides an extremely light-running wheel, having the greatest possible structural strength. Trip chains [replacable parts] are placed in the upper part, and track pins in the lower part to take the wear. The ATHEY track can be actually rebuilt, restoring the original arch and light-running qualities, with a reduction of 75% in track maintenance.

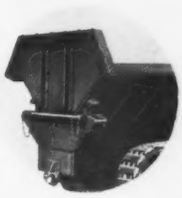


ATHEY'S bearing seal is 100% effective. Sand, grit, abrasive materials are positively excluded by ATHEY'S triple seal, eliminating one of the greatest and most common causes of bearing failure.



The TRUSS SHOES are of the High Truss, Short Pitch type which reduces to a minimum the various stresses and bearing pressures. This increases their natural life and gives free-running qualities. They, therefore, have a greater factor of reserve strength with minimum weight.

The bodies can be any of the various Easton types that dump to either side or to the rear. • • • Actual operation figures prove that ATHEYS cut truck haulage costs 35 to 40%. Make tremendous savings over rail operation costs where hauls are short and frequent shooting is required. Modern operators want ATHEY'S new flexibility in operation—quicker trips—bigger loads per trip—larger capacities—longer life and lower maintenance.



ATHEY TRUSS WHEEL CO.
130 North Wells Street
CHICAGO, U. S. A.
Cable Address: "Trusswheel", Chicago

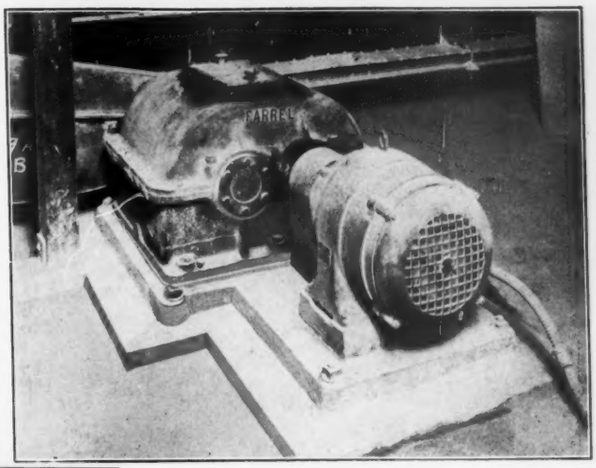
The Baldwin Locomotive Works, Foreign Representatives, Philadelphia, Pa.

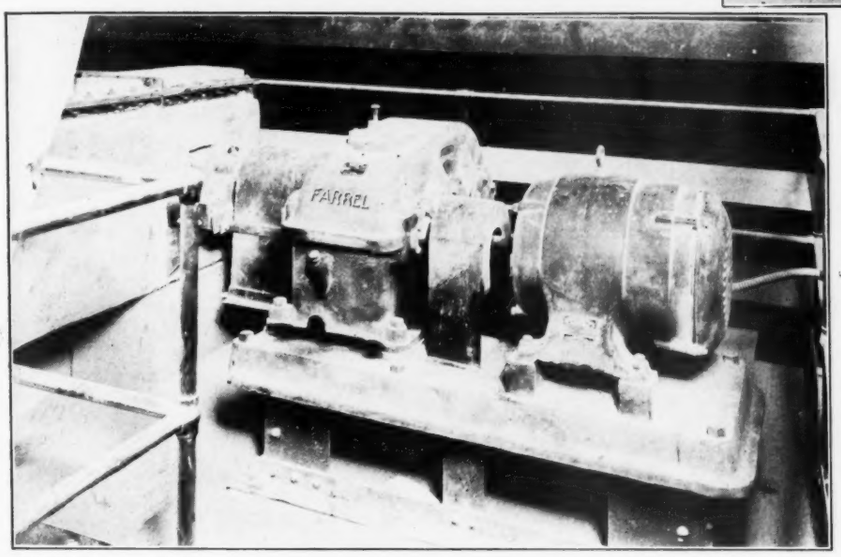
See OUR Exhibit at the ROAD SHOW

Athey

TRUSS WHEEL EQUIPMENT

Continuous, Efficient Operation Under Severe Conditions Is Obtained with FARREL-SYKES Speed Reducers

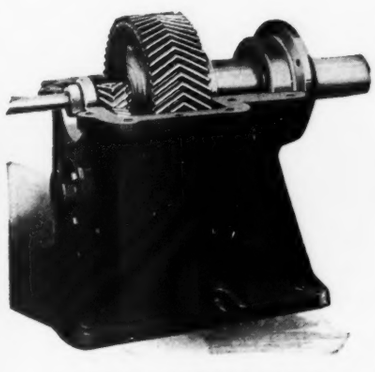




98 to 99%
MECHANICALLY EFFICIENT

ROLLER BEARINGS THROUGHOUT

SYKES HERRINGBONE GEARS

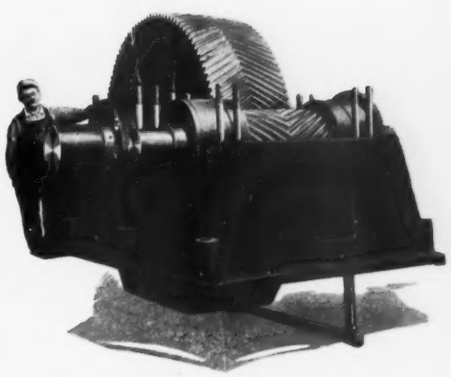


TYPICAL CONVEYOR DRIVE

OUR STANDARD SERIES CONSISTS OF OVER 80 DIFFERENT DESIGNS

Ratios 1/1 to 500/1

WRITE FOR CATALOG



TYPICAL MILL DRIVE

1 H.P. to 5000 H.P.

FARREL-BIRMINGHAM CO. Inc.

SUCCESSOR TO
FARREL FOUNDRY & MACHINE CO., ANSONIA, CONN., AND
BUFFALO, N. Y., AND BIRMINGHAM IRON FOUNDRY OF DERBY, CONN.
ADDRESS REPLIES TO THIS ADVERTISEMENT TO BUFFALO PLANT
344 VULCAN ST., BUFFALO, N. Y.

Bring Your Superintendents

Engineers and Operating Men

The Latest in Equipment and Machinery

Helpful and Inspiring Talks

Educational Discussions

Renewed Friendships

Enjoyable and Unique Entertainment

The Fourteenth Annual Convention

of the

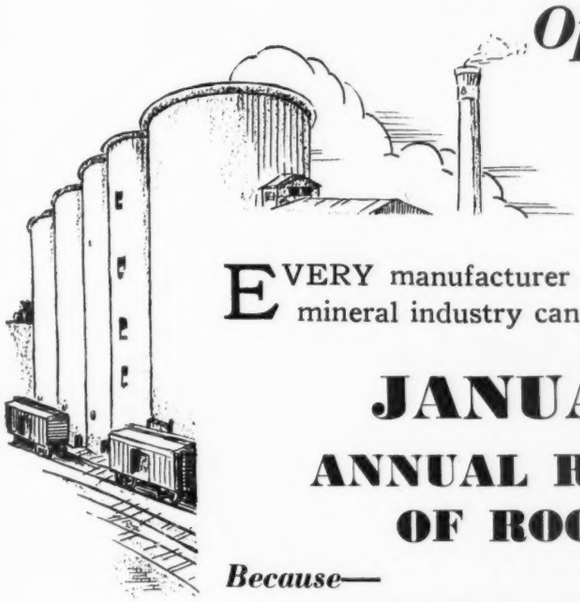
National Crushed Stone Association

Hotel Jefferson—St. Louis, Missouri

January 19, 20, 21 and 22, 1931

Mr. Advertiser:

Don't Miss The One Big Sales Promotion Opportunity Of The Year



EVERY manufacturer of equipment used in the nonmetallic mineral industry can profit by being represented in the

JANUARY 3, 1931

ANNUAL REVIEW NUMBER OF ROCK PRODUCTS

Because—

The men who do the buying in this field look forward to this issue of ROCK PRODUCTS. It always holds a special appeal for them, because it carries articles dealing with plant improvement, better methods of operation, and the knowledge and information accumulated from thousands of miles of editorial travel as well as personal visits to hundreds of plants.

ROCK PRODUCTS enjoys the entire industries' confidence and collaboration—prompted by its own desire to have a reliable, authentic annual summing-up of the current year and a forecast of the next.

Advertisers will get a complete coverage of all the worth-while producers, who, because of the importance to them, of this issue, will refer to it constantly throughout the entire year.

Reserve space now—plan to use space sufficiently large to properly convey your message and also your importance to the rock products industry.

Good location, like good seats, must be spoken for well in advance, so act promptly.

Send rough draft of your proposed advertisement if you wish, and the ROCK PRODUCTS service department will whip it into shape, and submit it for your approval.

Forms Close December 26, 1930

MEMBER AUDIT BUREAU OF CIRCULATIONS

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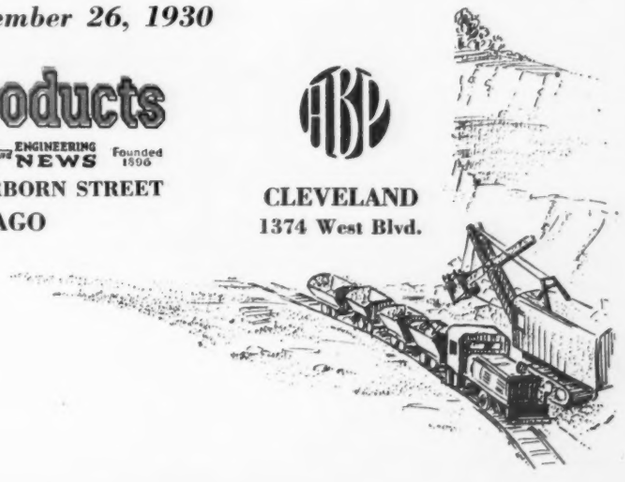
280 Madison Ave.

Rock Products
With which is incorporated CEMENT and ENGINEERING NEWS Founded 1896
542 SOUTH DEARBORN STREET
CHICAGO

ABP

CLEVELAND
1374 West Blvd.



Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 144

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

Abrasives
Pangborn Corp.

Acetylene Welding Rod
Haynes Stellite Co.

Aerial Wire Rope Tramways (See Tramways, Aerial Wire Rope)

Agitators, Thickeners and Slurry Mixers
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Fuller Company

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Raymond Bros. Impact Pulv. Co.
Sturtevant Mill Co.
Universal Road Machinery Co.

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Haynes Stellite Co.
Stoody Company

Automatic Weighers
Merrick Scale Mfg. Co.
Sintering Machinery Corp.

Babbitt Metal
Jos. T. Ryerson & Son, Inc.
Westinghouse Electric & Mfg. Co.

Backfillers (Ditching Machines)
Bucyrus-Erie Company

Back Stops
D. O. James Mfg. Co.

Bagging Machinery
Bemis Bro. Bag Co.

Bags
Bemis Bro. Bag Co.

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
Hardinge Co., Inc.
F. L. Smidth & Co.

Batchers
Blaw-Knox Company

Bearings
Haynes Stellite Co.
Hyatt Roller Bearing Co.
Link-Belt Co.
Webster & Weller Mfg. Companies
Westinghouse Electric & Mfg. Co.

Bearings (Anti-Friction)
Hyatt Roller Bearing Co.

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Hewitt Gutta Percha Rubber Corp.
New York Belting & Packing Co.
Robins Conveying Belt Co.

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Blaw-Knox Company
Burrell Eng. & Const. Co.
Good Roads Machinery Co., Inc.
Traylor Eng. & Mfg. Co.
Universal Crusher Co.
Webster & Weller Mfg. Companies

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Fuller Company
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Link-Belt Co.
Robins Conveying Belt Co.
Traylor Eng. & Mfg. Co.

Blast Hole Drills (See Drills)

Blocks (Pillow, Roller Bearing)
Hyatt Roller Bearing Co.
Link-Belt Co.

Blocks (Sheave)
Sauerman Bros.

Blowers
Pangborn Corp.

Blowpipes
Stoody Company

Blow Torches
Westinghouse Electric & Mfg. Co.

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Easton Car & Construction Co.

Boilers
Combustion Eng. Corp.

Breakers (Primary)
Smith Engineering Works

Brick Machinery (Sand Lime and Slag)
Jackson & Church Co.

Bucket Conveyors (See Conveyors and Elevators)

Buckets, Clamshell (See Buckets, Grab, Clamshell, etc.)

Buckets (Dragline and Slackline)
Bucyrus-Erie Co.
Sauerman Bros.

Buckets (Elevator and Conveyor)
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
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Polysius Corporation
Robins Conveying Belt Co.
W. Toepfer & Sons Co.

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Link-Belt Co.
Owen Bucket Co.

Buildings, Steel
Blaw-Knox Company

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Link-Belt Co.
Sauerman Bros. (Slackline)

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J. B. Ehrsam & Sons Mfg. Co.

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Link-Belt Co.

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Easton Car & Construction Co.
Western Wheeled Scraper Co.

Cars (Quarry and Gravel Pit)
Atlas Car & Mfg. Co.
Easton Car & Construction Co.
Western Wheeled Scraper Co.

Car Wheels (See Wheels, Car)

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Eagle Iron Works (Grey Iron)
Fuller Lehigh Company
Haynes Stellite Co.
Link-Belt Co.
National Malleable and Steel Castings Co.
Vulcan Iron Works (Iron and Steel)

Cement Making Machinery
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Cement Pumps
Fuller Company

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Jeffrey Mfg. Co.
National Malleable & Steel Castings Co.

Chain (Elevating and Conveying)
Bethlehem Foundry & Machine Co.
Link-Belt Company

Chain Links (Cold Shut, Repair, etc.)
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F. L. Smidth & Co.
Wilkinson Process Rubber Sales Corp.

Chutes for Minimizing Segregation
Robins Conveying Belt Co.

Clamshell Buckets—(See Buckets—Grab, Clamshell, etc.)

Clamshell Cranes (See Cranes)

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Hardinge Co., Inc.

Classifiers
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Eagle Iron Works (Flume Valve)
Link-Belt Company

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F. L. Smidth & Co.

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The Dorr Company

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Westinghouse Electric & Mfg. Co.

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
Link-Belt Company
Robins Conveying Belt Co.

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Fuller Co.
Good Roads Machinery Co., Inc.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
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Smith Engineering Works
Sturtevant Mill Company
W. Toepfer & Sons Co.
Traylor Eng. & Mfg. Co.
Universal Crusher Co.
Western Wheeled Scraper Co.

Conveyors, Pneumatic
Fuller Company

Conveyors (Screw)
Bethlehem Fdy. & Machine Co.
Link-Belt Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplers (Automatic Car)
National Malleable and Steel Castings Co.

Couplings (Flexible and Shaft)
D. O. James Mfg. Co.
Link-Belt Co.
Philadelphia Gear Works

Couplings (Hose, Pipe, etc.)
Hewitt Gutta Percha Rubber Corp.
New York Belting & Packing Co.

Cranes (Barge)
The Ohio Locomotive Crane Co.

Cranes, Clamshell
Bucyrus-Erie Co.
Dayton-Whirley Co.

Cranes (Crawler and Locomotive)
Atlas Car & Mfg. Co.
Bucyrus-Erie Co.
Harnischfeger Corporation
Industrial Brownhoist Corp.
Link-Belt Co.
Ohio Locomotive Crane Co.
The Osgood Company
Thew Shovel Co. (Electric, Gasoline and Steam)

Cranes, Dragline
Dayton-Whirley Co.

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Dayton-Whirley Co.

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Dayton-Whirley Co.
Harnischfeger Corporation
Industrial Brownhoist Co.

Cranes (Locomotive)
(See Cranes Crawler and Locomotive)

Cranes (Overhead Traveling Electric)
Harnischfeger Corporation
Industrial Brownhoist Corp.

Cranes, Revolving
Dayton-Whirley Co.

LAY-SET

is a Preformed Wire Rope

Hazard Wire for Every Service

•

HAZARD ARMORED WIRE ROPE (GORE PATENT)—for use on operations where the service is particularly severe—such as Steam Shovels, Dredges, etc.

HAZARD OLYMPIC GREEN STRAND—for use on all hoisting operations requiring maximum toughness and long wearing qualities.

Hazard Bear Cat Rope—Marline Covered Wire Rope—Improved Flattened Strand Wire Rope—Slope Ropes, etc., etc.

and preforming makes a *much* better rope. One that wears longer by 30% to 300%—handles easier—runs straight—resists kinking—saves time.

In Lay-Set, each wire and strand is set, or preformed, to the exact lay it must assume in the finished rope. This preforming frees all wires and strands from internal stress, and thus enables them to give their full measure of service without wasting a part of their energy in locked-up stress.

Send for a copy of the Hazard "Book of Facts about Lay-Set." It tells *why* preformed wire rope is the economical rope to use. To request a copy places you under no obligation beyond that of reading the book when you receive it. Write for it—today.

HAZARD WIRE ROPE COMPANY
WILKES-BARRE PENNSYLVANIA
New York Pittsburgh Ft. Worth Chicago Los Angeles
San Francisco Denver Birmingham Philadelphia Tacoma

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 144

Crusher Parts
Earle C. Bacon, Inc.

Crushers (Hammer)
Pennsylvania Crusher Co.
Sturtevant Mill Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.
C. G. Buchanan Co., Inc.
Good Roads Machinery Co., Inc.
Lewistown Fdry. & Mach. Co.
Nordberg Mfg. Co.
Polysius Corporation
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Crusher Co.
Universal Road Machy. Co.
Western Wheeled Scraper Co.

Crushers (Rotary)
J. B. Ehrsam & Sons Mfg. Co.
Oliver Machinery Co.

Crushers (Single Roll)
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Machine Co.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
C. G. Buchanan Co., Inc.
Fuller Lehigh Company
Jeffrey Mfg. Co.
Sturtevant Mill Co.
Traylor Eng. & Mfg. Co.

Cutter—Traveling Chain Ladder Type Suction Nozzle
Eagle Iron Works

Cutting Apparatus
Stoody Company

Derricks and Derrick Fittings
Dayton-Whirley Co.
Harnischfeger Corporation

Dewatering Machines
The Dorr Company

Dippers and Teeth (Steam Shovel)
Bucyrus-Erie Co.
Harnischfeger Corporation
Thew Shovel Co. (Steam Shovel)

Ditchers
Bucyrus-Erie Co.
Harnischfeger Corporation

Draglines
Bucyrus-Erie Co.
Harnischfeger Corporation
Link-Belt Co.
Thew Shovel Co.

Dragline Cableway Excavators
Bucyrus-Erie Co.
Good Roads Machinery Co., Inc.
Link-Belt Co.
Sauerman Bros.
Street Bros. Machine Works

Dragline Excavators
Bucyrus-Erie Co.
Dayton-Whirley Co.
Harnischfeger Corporation
The Osgood Company
Thew Shovel Co. (Electric, Gasoline and Steam)

Drag Scrapers (See Scrapers, Power Drag)

Drag Shovels
Bucyrus-Erie Co.

Dredge Chain (See Chain)

Dredge Pipe (See Pipe)

Dredges
Bucyrus-Erie Co.
Ellicott Machine Corp. (Sand and Gravel)
Morris Machine Works
The Osgood Company
F. M. Welch Engineering Service
Yuba Mfg. Co.

Drilling Accessories
Loomis Machine Co.

Drills (Blast Hole)
Loomis Machine Co.

Drills, Well (See Drills, Blast Hole)

Drives (See Gears, Chain Drives, etc.)

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Drives (Worm)
Cleveland Worm and Gear Co.
D. O. James Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Combustion Eng. Corp.
Filtration Engineers (Cement Slurry)
Fuller Lehigh Company
Lewistown Fdry. & Mach. Co.
Louisville Drying Machinery Co. (Rotary)
McGann Mfg. Co., Inc.
Ruggles-Coles Div. of Hardinge Co., Inc.
Traylor Eng. & Mfg. Co.
Vulcan Iron Works (Rotary)

Dump Bodies, Truck
Athey Truss Wheel Co.

Dust Arresters
Pangborn Corp.
Parsons Engineering Corp.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
Pangborn Corp.
Parsons Engineering Corp.

Dust Control
Blaw-Knox Company

Dust Conveying Systems
Fuller Co.

Electric Cables and Wires
General Cable Corp.

Electric Haulage Systems
Westinghouse Elec. & Mfg. Co.
Geo. D. Whitcomb Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Elevator Belting (See Belting)

Elevator Buckets (See Buckets—Elevator)

Elevators (See Conveyors and Elevators)

Emery Mills
Sturtevant Mill Co.

Engineers
Arnold & Weigel, Inc.
Burrell Eng. & Const. Co.
The Dorr Company
Pangborn Corp.
Productive Equipment Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
F. M. Welch Engineering Service
Yuba Mfg. Co.

Engines (Diesel)
Nordberg Mfg. Co.

Engines, Diesel—Semi-diesel
Power Mfg. Co.

Engines (Gasoline, Kerosene & Oil)
Le Roi Company
Power Mfg. Company

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Exhaust Equipment
Pangborn Corp.

Fans
Westinghouse Electric & Mfg. Co.

Fans (Exhaust)
Jeffrey Mfg. Co.
Parsons Engineering Corp.

Feeders
Robins Conveying Belt Co.

Feeders, Chain
Ross Screen & Feeder Co.

Feeders, Plate
Smith Engineering Works

Feeders (Pulverized Coal)
Fuller Lehigh Company

Feeders, Weighing
Hardinge Co., Inc.
Schaffer Poidometer Company

Filter Cloth
Filtration Engineers Inc.

Filters (Cement Slurry)
Filtration Engineers Inc.

Frogs and Switches
Atlas Car & Mfg. Co.
Easton Car & Construction Co.
Westinghouse Electric & Mfg. Co.

Furnaces
Combustion Eng. Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Fuses (Electric)
Westinghouse Electric & Mfg. Co.

Gaskets
Hewitt Gutta Percha Rubber Corp.
New York Belting & Packing Co
Wilkinson Process Rubber Sales Corp.

Gasoline Engines (See Engines—Gasoline, Kerosene and Oil)

Gates, Bin (See Bin Gates)

Gears (Herringbone)
D. O. James Mfg. Co.

Gears (Spur, Helical, Herringbone and Worm)
The Cleveland Worm & Gear Co.
Farrel-Birmingham Co., Inc.
D. O. James Mfg. Co.
Jeffrey Mfg. Co.
W. A. Jones Fdy. & Machine Co.
Philadelphia Gear Works

Gears and Pinions
Bethlehem Fdy. & Machine Co.
Farrel-Birmingham Co., Inc.
D. O. James Mfg. Co.
Link-Belt Co.
Philadelphia Gear Works

Gear Reducers
Cleveland Worm & Gear Co.
Farrel-Birmingham Co., Inc.
D. O. James Mfg. Co.
Philadelphia Gear Works

Generators (See Motors and Generators)

Grab Bucket Cranes (See Cranes)

Grab Bucket Hoists (Monorail) (See Cranes)

Grab Buckets—See Buckets (Grab, Clamshell, etc.)

Grate Bars (Iron)
National Malleable and Steel Castings Co.

Grating (Steel)
Blaw-Knox Company

Grinding Balls
Fuller Lehigh Co.
Jeffrey Mfg. Co.
Philadelphia Steel & Iron Co.

Grizzlies
Eagle Iron Works
Good Roads Machinery Co., Inc.
Lewistown Fdy. & Mach. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Western Wheeled Scraper Co

Grizzly Feeders
Traylor Eng. & Mfg. Co.

Guns, Hydraulic
Taylor Forge & Pipe Wks.

Gypsum Plaster Plants
J. B. Ehrsam & Sons Mfg. Co.

Gyrating Screens (See Screens)

Hammer Mills (See Crushers)

Hard Facing Materials
Haynes Stellite Co.

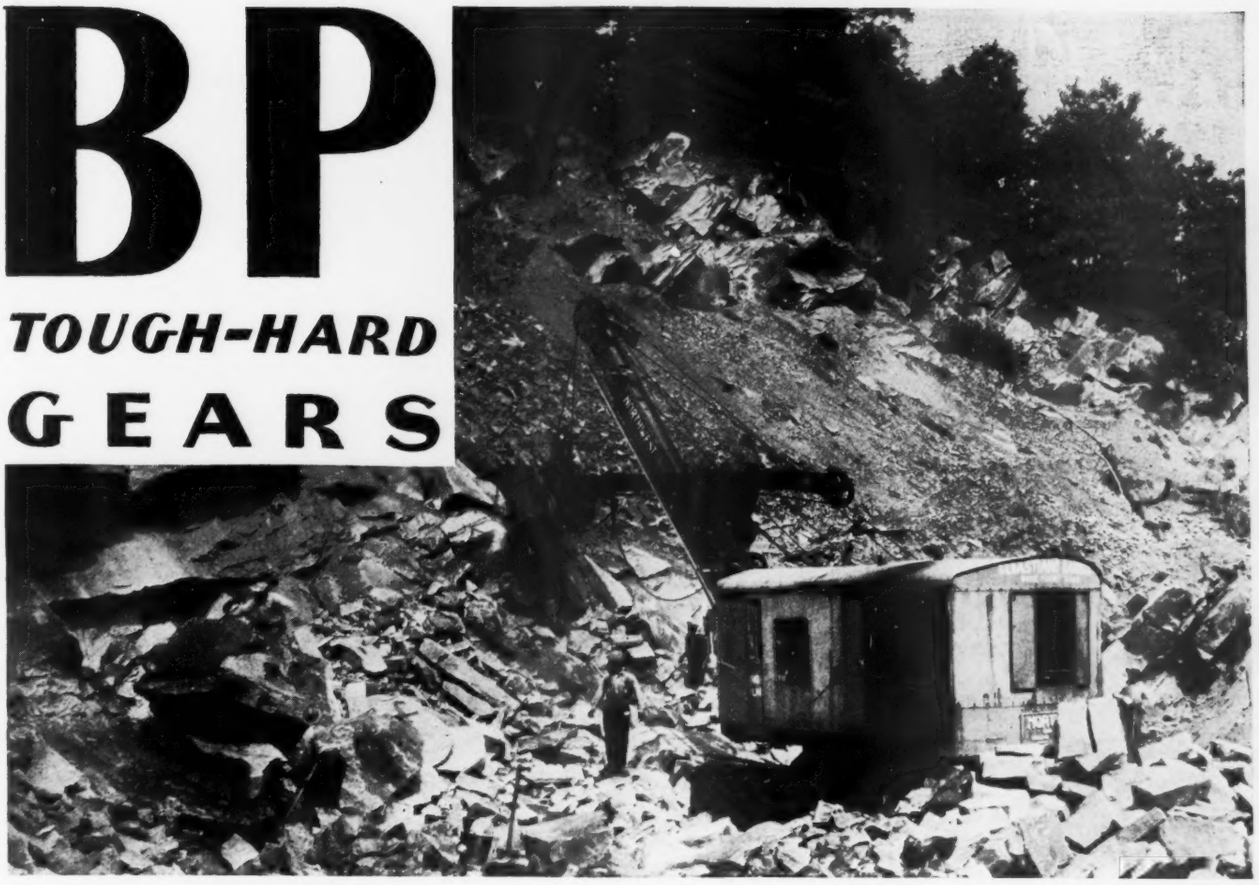
Hascrome
Haynes Stellite Co.

Hastelloy
Haynes Stellite Co.

Haulage Systems Electric (See Electric Haulage Systems)

Heaters
Westinghouse Electric & Mfg. Co.

BP
TOUGH-HARD GEARS



On many prominent makes of power shovels, BP "tough-hard" gears are standard equipment.

Longer wear
Less breakage

IN power shovels, crushers, grinders, pug mills, auger machines and other severe duty equipment, Westinghouse-Nuttall BP "tough-hard" gears fully meet the requirements necessary to withstand sudden jolts and jerks, as well as the hard grind of sustained operation in dust and grit.

These heat-treated gears are remarkably wear-resistant and they also have the great strength necessary to resist the severe impacts of rock products operations.

The special process by which they are heat-treated produces a homogeneous structure, at least four times harder than the original material and also several times stronger due to the uniform increase in toughness toward the center of the teeth.

In identical service, BP "tough-hard" gears are guaranteed to outlast at least four untreated gears—yet they cost but slightly more.

This superior performance can be had in Westinghouse-Nuttall spur, helical, herringbone, and bevel gears up to 102 inches in diameter. These and other heat-treated gears are fully described in Folder 5223. Request a copy from our nearest district office.

Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops

Westinghouse

T 31639

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Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

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Hitchings (Mine Car)
National Malleable and Steel Castings Co.

Hoists
Harnischfeger Corporation
Link-Belt Co.
Sauerman Bros.
Street Bros. Machine Works
Vulcan Iron Works (Electric and Steam)

Hoists (For Motor Trucks)
St. Paul Hydraulic Hoist Co.

Hoists, Skip (See Skip Hoists and Skips)

Hose Couplings (See Couplings)

Hose (Water, Steam, Pneumatic and Air Drill)
Hewitt Gutta Percha Rubber Corp.
New York Belting & Packing Co.

Hydrators (Lime)
Blaw-Knox Company
McGann Mfg. Co., Inc.
Vulcan Iron Works

Hydraulic Guns (See Guns, Hydraulic)

Journal Boxes
National Malleable and Steel Castings Co.

Kettles (Calcining)
Oliver Machinery Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Blaw-Knox Company
Hardinge Co., Inc.
Louisville Drying Machinery Co.
McGann Mfg. Co., Inc.
Polysius Corporation
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Vulcan Iron Works

Kilns, Lime
Blaw-Knox Company

Kilns (Shaft)
Arnold & Weigel, Inc.
Hardinge Co., Inc.
McGann Mfg. Co., Inc.
Vulcan Iron Works

Kominuters (See Mills)

Laboratory Crushers
Sturtevant Mill Co.

Lighters—Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Co.
Hardinge Co., Inc.
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime and Hydrating Plants
Blaw-Knox Company
McGann Mfg. Co., Inc.

Line Shaft Couplings
D. O. James Mfg. Co.
Philadelphia Gear Works

Linings (See Mill Liners and Linings)

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Loaders and Unloaders
Bucyrus-Erie Co.
Good Roads Machinery Co., Inc.
Harnischfeger Corporation
Link-Belt Co.
The Osgood Company
Robins Conveying Belt Co.

Locomotive Cranes (See Cranes)

Locomotives (Diesel)
The Fate-Root-Heath Co.
Plymouth Locomotive Works
Geo. D. Whitcomb Company

Locomotives, Diesel-Electric
The Fate-Root-Heath Co.
Heisler Locomotive Works
Plymouth Locomotive Works
Geo. D. Whitcomb Company

Locomotives (Gas Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works
Geo. D. Whitcomb Co.

Locomotives, Geared
Heisler Locomotive Works
Lima Locomotive Works, Inc.

Locomotives, Oil-Electric
The Fate-Root-Heath Co.
Heisler Locomotive Works
Plymouth Locomotive Works
Geo. D. Whitcomb Co.

Locomotives (Steam, Gas and Electric)
Fate-Root-Heath Co. (Gas)
Heisler Locomotive Works
Lima Locomotive Works
Plymouth Locomotive Works (Gas)
Vulcan Iron Works (All Types)
Westinghouse Electric & Mfg. Co.
Geo. D. Whitcomb Co.

Locomotives (Storage Battery)
Atlas Car & Mfg. Co.
Westinghouse Electric & Mfg. Co.
Geo. D. Whitcomb Co.

Log Washer
Smith Engineering Works

Lubricants
Vacuum Oil Co.

Machine Parts
Haynes Stellite Co.

Machinery and Tools (Metal Working)
Joseph T. Ryerson & Son, Inc.

Machinery Guards
Harrington & King Perforating Co.

Magnetic Pulleys
C. G. Buchanan Co., Inc.

Metal (Alloys—See Alloys, Babbitt Metal, Manganese Steel, Steel, etc.)

Metals (Acid and Corrosion Resistant)
Haynes Stellite Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
Bethlehem Fdy. & Machine Co.
Bradley Pulverizer Co.
Hardinge Co., Inc.
Lewistown Fdy. & Mach. Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Bethlehem Foundry & Machine Co.
Fuller Lehigh Company
Hardinge Co., Inc.
F. L. Smidth & Co.

Mining Engineers (See Engineers)

Motors and Generators (Electric)
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Motors (Gasoline)
Le Roi Company

Nozzles, Gravel Washing
Binks Mfg. Company

Nuggets (Tube Mill Grinding)
Philadelphia Steel & Iron Co.

Oils (Lubricating)
Vacuum Oil Co.

Ore Jigs
McLanahan & Stone Machine Co.

Packings (Pump, Valve, etc.)
Hewitt Gutta Percha Rubber Corp.
New York Belting & Packing Co.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
W. Toepfer & Sons Co.

Pile Drivers
Dayton-Whirley Co.
Harnischfeger Corporation
The Osgood Company

Pipe
Taylor Forge & Pipe Works

Pipe Flanges
Georgia Iron Works

Plaster Board & Wallboard Equipment
J. B. Ehrsam & Sons Mfg. Co.

Plug Valves (See Valves)

Poidometers
Schaffer Poidometer Co.

Portable Conveyors
Fuller Co.
Link-Belt Co.
Robins Conveying Belt Co.

Portable Crushing and Screening Unit
Smith Engineering Works

Portable Engines
Le Roi Company

Power Units
Le Roi Company
The Power Mfg. Co.

Pulleys, Friction Clutch
The Power Mfg. Co.

Pulleys Magnetic (See Magnetic Pulleys)

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Bradley Pulverizer Co.
Fuller Lehigh Co.
Hardinge Co., Inc.
Kent Mill Co.
Lewistown Fdy. & Mach. Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Universal Crusher Co.

Pump Parts
Haynes Stellite Co.

Pumps (Air Lift)
Fuller Co.
Pennsylvania Pump & Compressor Co.

Pumps, Cement
Fuller Company

Pumps (Cement Slurry)
The Dorr Company
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
American Well Works
Morris Machine Works
Pennsylvania Pump & Compressor Co.
A. R. Wilfley & Sons

Pumps (Dredging)
Bucyrus-Erie Company

Pumps (Pulverized Coal)
Fuller Lehigh Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
American Well Works
Ellicott Machine Corp.
Georgia Iron Works
Morris Machine Works
A. R. Wilfley & Sons

Rails
Easton Car & Construction Co.
Joseph T. Ryerson & Son, Inc.

Railway Equipment
Westinghouse Electric & Mfg. Co.

Road Machinery
Good Roads Machinery Co., Inc.
Harnischfeger Corporation
Industrial Brownhoist Co.
The Osgood Company
Western Wheeled Scraper Co.
Geo. D. Whitcomb Company

Rod Mills
Hardinge Co., Inc.
Jackson & Church Co.
Traylor Eng. & Mfg. Co.

Rolled Stock, for Liners, Etc.
Haynes Stellite Co.

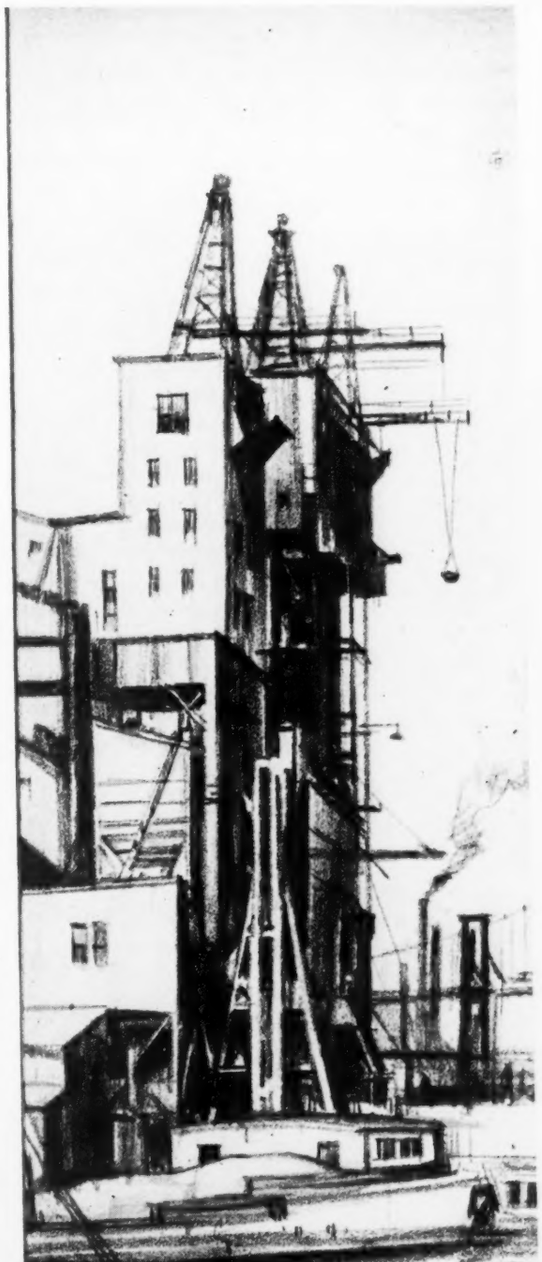
Roller Bearings
Hyatt Roller Bearing Co.

Rope (Wire) (See Wire Rope)

Safety Appliances
Pangborn Corp.

Sand and Gravel Handling Equipment
Wilkinson Process Rubber Sales Corp.

It was easy to *save* 42% on lubrication costs in this plant



With 100% cooperation from plant personnel, a mid-western brick plant was thoroughly studied by Vacuum lubrication engineers. The correct grade of Gargoyle lubricants was chosen for each machine and the proper method of application decided upon.

After a reasonable length of time, lubrication costs were compared with what they had been before Correct Lubrication was adopted. This comparison showed a saving of 42% was made in the cost of lubricating the entire plant.

(From Vacuum Oil Company File No. 1100)

Such a large saving may not be possible in your plant. But—in the many thousand industrial plants of all kinds, throughout the world, where Correct Lubrication has been adopted, there has been *an actual saving of operating costs, almost without exception.* Considering the great variation in plants, machinery, and operating personnel, this is a fact of high significance to industrial executives and engineers.

Thousands of reports from all types of industries are on file. Ask to see reports covering plants similar to your own. A Vacuum lubrication specialist will answer your request. He will also be glad to suggest where lubrication might be improved in *your* plant, in cooperation with your plant engineers.

In these days when costs must be cut, executives and engineers in industry are asking the Vacuum Oil Company for a show-down in facts and figures. *Your* request incurs no obligation. You will probably learn where and how substantial economies may be made in your own plant.

The following benefits result from Correct Lubrication:

1. Reduced friction
2. Reduced power consumption
3. Continuity of production
4. Reduced maintenance costs
5. Prolonged useful life of machinery
6. Reduced ultimate cost of lubricants and labor of applying them
7. Reduced total production costs.

Send for one or all of the above technical treatises on lubrication.

Vacuum Oil Company

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Lubricating Oils

The world's quality oils for plant lubrication

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

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Sand and Gravel Screening and Washing Equipment
Universal Road Machinery Co.

Sand-Blast Equipment
Pangborn Corp.

Sand Drag
Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works
F. M. Welch Engineering Service

Scrapers (Power Drag)
Link-Belt Co.
Sauerman Bros.

Scrapers (Wheeled and Drag)
Western Wheeled Scraper Co.

Screens
Allis-Chalmers Mfg. Co.
Earl C. Bacon, Inc.
Chicago Perforating Co.
Cross Engineering Co.
Eagle Iron Works
Rubert M. Gay Co., Inc.
Good Roads Machinery Co., Inc.
Hardinge Co., Inc.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Kent Mill Co.
Lewistown Fdy. & Machine Co.
Link-Belt Co.
McLanahan & Stone Machine Co.
Productive Equipment Co.
Robins Conveying Belt Co.
Ross Screen & Feeder Co.
Orville Simpson Co.
Simplicity Engineering Co.
Sturtevant Mill Co.
W. Toepfer & Sons Co.
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.
Universal Crusher Co.
Universal Vibrating Screen Co.
F. M. Welch Engineering Service
Western Wheeled Scraper Co.

Screens Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Vibrating)
Deister Machine Co.
Rubert M. Gay Co., Inc.
Link-Belt Co.
Productive Equipment Co.
Robins Conveying Belt Co.
Simplicity Engineering Co.
Smith Engineering Works
Orville Simpson Co.
Sturtevant Mill Co.
W. S. Tyler Co.
Universal Vib. Screen Co.

Screens Washing (Hercules Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers
F. M. Welch Engineering Service

Seal Rings (Kilns, Coolers and Dryers)
Bethlehem Fdy. & Machine Co.

Separators, Air (See Air Separators)

Separators (Magnetic)
C. G. Buchanan Co., Inc.

Separators (Slurry)
F. L. Smidth & Co.

Shale Removers
Eagle Iron Works

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Co.
Harnischfeger Corporation
Industrial Brownhoist Corp.
Link-Belt Co.
The Osgood Company
Thew Shovel Co. (Crawler Tractor)

Silos
Burrell Eng. & Constr. Co.
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.
Robins Conveying Belt Co.
Vulcan Iron Works
F. M. Welch Engineering Service

Slings (Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.

Slugs, Wire Rope
American Steel & Wire Co.

Speed Reducers
Cleveland Worm and Gear Co.
Farrel-Birmingham Co., Inc.
D. O. James Mfg. Co.
W. A. Jones Fdy. & Mach. Co.
Link-Belt Co.
Philadelphia Gear Works

Speed Reducers (Herringbone)
D. O. James Mfg. Co.

Spouts, Chutes (See Chutes and Chute Liners)

Spray Nozzles
Binks Mfg. Company

Sprockets and Chain
Philadelphia Gear Works

Stackers
F. M. Welch Engineering Service

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel, Electric Furnace
Chicago Steel Foundry Co.

Steel (Special Alloy)
Chicago Steel Foundry Co.
National Malleable & Steel Castings Co.
Stoody Company

Steel Plate Construction
Hendrick Mfg. Co.

Stellite
Haynes Stellite Co.

"Stellited" (Die Rings, etc.)
Bethlehem Fdy. & Machine Co.

Stokers
Combustion Eng. Corp.

Stoodite
Stoody Company

Storage Equipment
Sauerman Bros.

Tanks
Combustion Eng. Corp.
The Dorr Company
Link-Belt Co.

Testing Sieves and Shakers
W. S. Tyler Co.

Thickeners
The Dorr Company
Hardinge Co., Inc.

Tool Steel
Stoody Company

Tools, Drill (See Drilling Accessories)

Torches
Stoody Company

Track Equipment
Atlas Car & Mfg. Co.
Easton Car & Construction Co.
Western Wheeled Scraper Co.

Track Shifters
Nordberg Mfg. Co.

Trailer Cranes (See Cranes)

Trailers, 3-Way Dump
Athey Truss Wheel Co.

Tramways (Aerial Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.

Transmission Belting
Hewitt Gutta Percha Rubber Corp.
New York Belting & Packing Co.

Transmission Machinery
Allis-Chalmers Mfg. Co.
Cleveland Worm and Gear Co.
Farrel-Birmingham Co., Inc.
Hyatt Roller Bearing Co. (Roller Bearings)
D. O. James Mfg. Co.

Trenchers (Wheel and Ladder Type)
Harnischfeger Corporation

Trippers
Robins Conveying Belt Co.

Truck Cranes (See Cranes)

Trucks (Car)
Western Wheeled Scraper Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Flexible, for Mine Ventilation)
Bemis Bro. Bag Co.

Tunnelling Machines
Harnischfeger Corporation

Turbines
Westinghouse Electric & Mfg. Co.

Turntables
Easton Car & Construction Co.

Underground Loaders
The Osgood Company
Thew Shovel Co.

Underground Shovels
Nordberg Mfg. Co.

Valves
Haynes Stellite Co.
Stoody Company

V-Belt Drives
Philadelphia Gear Works

Ventilating Apparatus
Pangborn Corp.

Vibrating Screens (See Screens, Vibrating)

Wagons (Dump)
Western Wheeled Scraper Co.

Wagons and Trailers (Heavy Duty)
Athey Truss Wheel Co.

Wagons and Trailers (Dump)
Athey Truss Wheel Co.

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Deister Machine Co.
The Dorr Company
Eagle Iron Works
Lewistown Fdy. & Machine Co.
Link-Belt Co.
McLanahan & Stone Machine Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
F. M. Welch Engineering Service

Waste Heat Boilers
Combustion Eng. Corp.

Waterproof Bags
Bemis Bro. Bag Co.

Water Softening Systems
Deister Machine Co.

Weighers (Conveying)
Sintering Machinery Corp.

Weighing Equipment
Merrick Scale Mfg. Co. (Automatic Proportioning)
Schaffer Poidometer Co.
Sintering Machinery Corp.

Welding and Cutting Apparatus
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American Steel & Wire Co.
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Wire Rope Slings (See Slings, Wire Rope)

Worm Gears (See Gears)

Please Consider This in Your Holiday Giving:

You can make an inexpensive yet discriminating holiday gift to a friend by presenting him with a year of ROCK PRODUCTS.

A Gift That Will Last for a Year

There's still time if you do it today.

Just write to ROCK PRODUCTS, enclose $2.00, give the name of the gentleman to whom you are making the gift; and, of course, your own name.

We will advise the recipient of the gift and tell him that *you* are the donor.

Why Buy Two Crushing Units

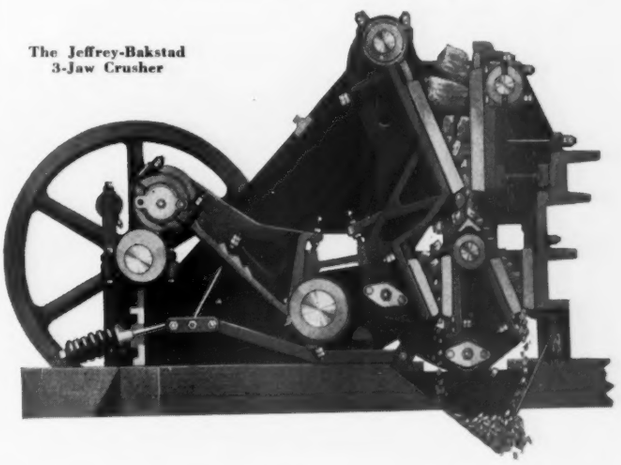
WHEN you can feed your material to one machine and produce a 1″ product—or finer if desired—without sacrificing capacity. The Jeffrey-Bakstad 3-Jaw Crusher performs both primary and secondary crushing jobs—it is three crushers in one. It will reduce material to the specified size in one operation.

The Jeffrey-Bakstad 3-Jaw Crusher will produce as much 1-inch product as a single jaw crusher unit would of 2-inch material. It will turn out twice as much material for any given size product as an ordinary single jaw crusher would with the same size receiving opening—and do it with considerably less power per ton than required for the single jaw crusher.

This unique principle of reduction—three jaws in one—will increase your production and at the same time effect a substantial reduction in your operating costs.

Write for Catalog No. 3-B

The Jeffrey-Bakstad 3-Jaw Crusher



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935-99 North Fourth St., Columbus, Ohio

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Jeffrey Manufacturing Co., Ltd. of Canada, Head Office and Works: Montreal—Branch Office: Toronto

JEFFREY
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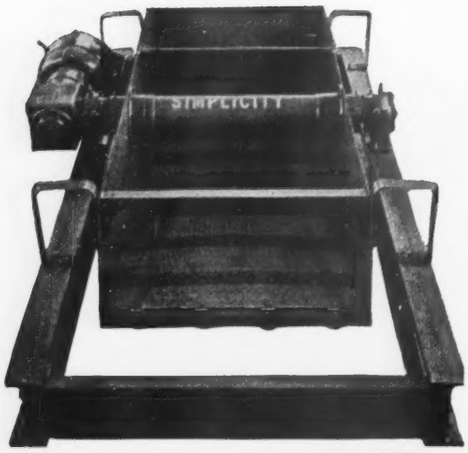

UTILITY Gyrators

For Speed, Accuracy and Capacity

THIS screen offers a real solution to screening problems where larger capacity with closer grading is demanded. The Simplicity Utility Gyrating Screen requires a small amount of floor space. It will grade as high as ONE HUNDRED and FIFTY TONS of material into three PERFECT GRADES in ONE HOUR on THIRTY-SIX square feet of Screen Surface, and requires only THREE HORSE-POWER.

The positive action of the vibrators gives the screen the same action and the same throw at all speeds, and over the entire surface—whether loaded or empty. There are no dead spots.

Impartial tests have shown definitely the superiority of the Simplicity Utility Gyrating Screen.

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ABRASION UP TO NOW THE UNCONQUERED IS SUBDUED BY LINATEX

A SUPERINTENDENT'S business life can be only half happy if abrasion and the expenses due to abrasion belong to his operating problems.

We suggest that these people should inquire from us what Linatex can do for them.

As an example, the above photograph shows a dredge launder lined with ¼" Linatex. At the time the photograph was taken, the Linatex had given 2½ years service without wear. Previously ½" steel plates lasted 6 months.

If this sort of thing is a worry to you, turn it over to us.

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WILKINSON PROCESS RUBBER SALES CORP.

53 W. Jackson Blvd. Chicago — 104 Pearl St. New York

AND

HEWITT-GUTTA PERCHA RUBBER CORPORATION

Buffalo, N. Y.

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Every last man in your plant can profit by reading ROCK PRODUCTS regularly. It will help him to bring new interest and new efficiency to his job.

Rock Products
With which is incorporated CEMENT and ENGINEERING NEWS Founded 1890
542 South Dearborn Street, Chicago, U.S.A.

We produce:

☐ Crushed Stone	☐ Gypsum
☐ Sand & Gravel	☐ Phosphate
☐ Glass Sand	☐ Cement
☐ Lime	☐ Slate
☐ Sand-Lime Brick	☐ Talc

Other Materials.....

We retail.....

See to it that ROCK PRODUCTS reaches you regularly—and pass it around! Subscriptions for the keymen would be mighty good investments.

Date....., 1930

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It is part of Rock Products' conception of its duty to readers and subscribers to help them in every possible and legitimate way. The "Situations Vacant" and "Situations Wanted" advertisements are a part of this service. The charges of 2 cents a word, or a minimum charge of a dollar per insertion, are nominal and not designed for profit. Numerous letters from these advertisers assure us of the effectiveness of these advertisements in finding capable men for openings and of finding openings for capable men.

Classified Advertisements

POSITIONS WANTED — POSITIONS VACANT—Two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page

CLASSIFIED—Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

USED EQUIPMENT FOR SALE

Shovels or Cranes

FOR SALE OR RENT

Rental payments may apply on Purchase

1—Factory rebuilt Lima 1¼ cu. yd. capacity. This machine can be equipped with either shovel, clamshell, dragline or drag shovel attachments. Very reasonably priced. Carries new machine guarantee. Located at New York.

1—Gas-Air Erie shovel 1 yd. capacity A-1 condition. Ready for service. Located Richmond, Va.

Marion No. 32 Electric Shovel, 1¼ cu. yd.; 50 hp. G. E. Motor; 3 phase, 60 cycle, 440 v. Splendid condition. Located New York City.

Complete Shovel Attachment for Type "O" Thew, located Buffalo, N. Y. Also, attachment for Type B and B-2 Eries located in New Jersey. Decided bargains.

OSGOOD gasoline shovel 1 yd. capacity located Philadelphia. Good condition attractive price.

1—Linn Tractor, 6-yd. capacity, with Waukesha Motor. Machine in very good condition. Priced to sell quickly. Located New York State.

We have both Steam and Gasoline Excavators ranging from ½ to 1½ cu. yd. capacity in various parts of the country that will be sold at extremely low prices or leased with leased payments made applying on purchase price.

CHAS. F. COHEN

Lima, O., Office:
Lima Trust Bldg.
Tel. Main 4824

New York Office:
2351 Graybar Bldg.
420 Lexington Ave.
Tel. Lexington 9934

Wire or phone at my expense.

Revolving Screens

4—48" x 20' Allis Chalmers, with 18' jackets, and complete drive equipment (25 H.P. Motors and Tex Rope Drives). ALL BRAND NEW IN APRIL, 1930. Plant change necessitates removal this Winter. This is the best buy possible in this class of equipment.

Phone or write:

New York Trap Rock Corp.
250 Park Avenue New York City
'Phone Eldorado 0500

FOR SALE

CRANES, ETC.

P. & H. Model 206, ¾-yd. Dragline.
Byers, 10-ton Cater. Crane, ¾-yd. Clam.
O. & S. 22½-ton Loco. Crane, 50' Boom.

CARS

16—12-yd. Western, Steel Beam Dump Cars.
10—50-ton capacity, All Steel Twin Hopper Cars.

LOCOMOTIVES

75-ton, 20x26", 6-Dr. Switcher, A.S.M.E.
50-ton. 18x24", 6-Driver Switcher.
92-ton, 20½x28", Mikado (2-8-2), Built 1922.
35-ton, 13x20", 4-Driver Saddle Tank, A.S.M.E.
56-ton, 18x24", 4-Driver Saddle Tank.

We have over forty locomotives in stock, rebuilt and ready, all types, 10 to 100 tons

Southern Iron & Equipment Co.
Est. 1889 Atlanta, Georgia

FOR SALE

GYRATORY CRUSHERS

42" McCully
No. 8 McCully
No. 7½ McCully
No. 6 McCully

JAW CRUSHERS

8"x14" Cartersville
24"x36" Traylor
24"x36" Farrel
60"x48" Traylor

KILNS

7'x100' Rotary
6'x40' Rotary
7½'x20' Rotary Roaster
6'x125' Steel Stack (Self-Supporting)
Lot of Steel Tanks

THE EQUIPMENT SALES CO.
R. W. Storrs, Jr., Mgr. Richmond, Va.

CRUSHING ROLLS

1—36" x 16" set of crushing rolls.

Also a full list of drying, grinding, pulverizing and other mining machinery. Send us your inquiries.

HEINEKEN ENGINEERING CORPORATION
31 Nassau Street New York
Tel. Hitchcock 4378-9

CRANES

1—12-ton NORTHWEST, 40 ft. boom, used 3 mos., like new.
1—6-ton BROWNING Truck-Crane, 1930.
1—25-ton BROWNING (Loco.) 50 ft. boom, Nat. Bd. Boiler, used 2 years.

SHOVELS

2—50-B BUCYRUS, 2-yd., late 1927, also 50 ft. boom and 1½-yd. Dragline Bucket.
1—KOEHRING, GAS, ¾-yd., rebuilt 1930.
2—LORAIN 75-A, GAS, 1¼-yd., 1929.
1—ERIE B-2 DREADNAUGHT, Steam, 1-yd., late 1928, Chain Drive Crawlers, also 40 ft. crane boom, ¾-yd. C. S. Bucket, slightly used, like new.

Grey Steel Products Company, Inc.
111 Broadway New York, N. Y.
(Telephone: Worth 5273)

FOR SALE

10—24"x36", 28"x36", 36"x54" Jaw Crushers and all smaller sizes.
15—Gyratory Crushers, 42" McCully, 30" McCully, 10-K Gates, No. 10 Austin, 9-K Gates, No. 8 Gates, No. 8 McCully, No. 8 Kennedy, 7½ Kennedy, 7½ Gates, 16" Traylor, 14" NEW Allis-Chalmers, No. 37 Kennedy, and all smaller sizes.
1—6" McCully Fine Reduction, with motor.
1—7" Newhouse, with motor.
8—4'x16' and 4'x20' Allis-Chalmers Screens.
10—Crushing Rolls, 16x10, 20x14, 36x16.
3—18", 24" Single Roll Crushers.
10—Vibrating Screens, Tyler No. 37 4x5, No. 31 3x5; Niagara 2x3, 3x6; Leahy 3x6; Link Belt 4x8, etc.
1—1 yd. Erie B Steam Shovel.
3—6'x22"; 6'x30" Hardinge Ball Mills

All sizes and types Jaw, Gyratory and Roll Crushers, Swing Hammer Mills, Elevators, Belt Conveyors, Rotary and Vibrating Screens, Rotary Kilns and Dryers, Raymond and other fine Pulverizers, Air Separators, Hardinge Ball and Pebble Mills, silex and iron lined Tube Mills, Shovels and Cranes, etc. Send for Bulletin No. 11

CONSOLIDATED PRODUCTS COMPANY, INC.

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Shops and Yards at
Newark, N. J., cover six acres

Barclay 7-0600

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CLASSIFIED ADVERTISEMENTS

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AIR SEPARATOR

1—Gayco 14 ft. Air Separator.

HAMMER MILL

1—Pennsylvania all steel, hopper 2'9" x 1'8", in guaranteed condition.

GYRATORY CRUSHER

1—Allis-Chalmers 5-K Gyratory Crusher.

VERTICAL BELT BUCKET ELEVATORS

1—18" x 75'.
1—16" x 60'.
1—14" x 60'.
In condition like new.

BELT CONVEYOR

1—18" x 230' long with or without automatic trip, in condition like new.

JAW CRUSHER

Farrel 24 x 36, 15-B, deep frame type. Cap. 600 tons to 3", 550 tons to 2½", 500 tons to 2". In condition like new with new manganese parts.

SAND AND GRAVEL PLANT

with Sauerman 2 yd. electric slackline, 1 yd. electric drag scraper outfits, washing, screening, pumping equipment, etc. Ninety percent new condition. See our ad August 2 issue.

A. J. O'NEILL CO.
406 Weightman Bldg., Philadelphia, Pa.

USED SHOVEL AND CRANE BARGAINS

A complete line of ½ to 1¼ yard Shovels and Cranes — many factory rebuilt and warranted—every one a bargain with many remaining years of profitable service offered at sensational prices—some as low as $1000—for outright sale or rental, with rentals applying on purchase. Send for details.

Wire or phone collect for bargain prices Lorain 8864 or 6955

OVERLOOK MACHINERY SALES
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LOCOMOTIVE CRANES

25-ton Browning 8-wheel 2-line 50' boom.
15-ton Link-Belt 8-wheel 2-line 50' boom.

LOCOMOTIVES

55-ton Vulcan 4-wheel saddle tank.
50-ton 16x24" American 4-wheel saddle tank.
33-ton 13x18" Porter 4-wheel saddle tank.
72-ton 20x26" American 6-wheel switcher.
50-ton 17x24" Davenport 6-wheel switcher.

CARS

75—4-yard Western heavy duty 4-pedestal 2-way dumps, 36" gauge.

SHOVELS

20-B Bucyrus caterpillar steam shovel.

BIRMINGHAM RAIL & LOCOMOTIVE CO.
Box 391
BIRMINGHAM ALABAMA

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Hoists, pumps, etc. Guaranteed equipment. Inquiries and surplus lists solicited.

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150—24" gauge 2-way Western and Austin dump cars, one and one and one-half yard capacity, in good serviceable second-hand condition. Also a number of new "V" shaped dump cars, 24" gauge; rails, new and relaying and all sorts of tracks supplies of all sections. Also gasoline locomotives, 24" and 36" gauge and batch box cars in good serviceable condition, as well as portable track to go with same.

220 East 42nd Street New York City

M. K. FRANK

1204 Clark Bldg. Pittsburgh, Pa.

FOR SALE

Complete Commercial Duntile Plant

In first-class condition. Located New York. Ready to operate. Must be sold immediately at a real bargain. Don't answer unless you mean business.

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One 15 H. P. double drum Lambert Electric Hoist. Capacity, 3 tons at 150 feet per minute. Drums 10 inches diameter, 16 inches between flanges. New in 1927 and has been used very little. Complete with motor and all attachments.

ROCKDALE-CORSON LIME COMPANY
Strasburg Junction, Virginia

HEAVY STEEL SKIPS

34—4-yd. steel stone skips, ½" plate, 1½ x 4 bands.

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BOOSTER AIR TANKS

21" x 9½' Pullman Tanks, 300 lbs. Pressure. Just the right thing for your Air Line.
$35.00 each, while they last.
Get our Power Equipment Bulletin 415.

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Rails, Equipment, Machinery, Hoists, Oil Engines, Piling, Tanks, Pipe, etc.

One 1 yd. 100 H.P. Electric 3-Speed Mead-Morrison Double Drum Slack Line Hoist, nearly new—price very reasonable.

BOEHCK MACHINERY CO., Inc.
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WANTED

36" Belt conveyor 100 ft. c. to c.
30" belt and bucket elevator.
150 H.P. slip ring motor with resistance and drum controller for 440 volt 60 cycle.
No. 3 or 4 Symonds cone crusher.

Address H. R. 230 Cypress St., Brookline, Mass.

Wanted to Buy

Dorrco Sand Washer, state price and location. For Sale—2 Rotex Screens in good condition complete with motors. Address

Box 424, care of Rock Products
542 South Dearborn St. Chicago, Ill.

WANTED

Symons 4' Cone Crusher

in good condition; located within reasonable distance of central New York.

Address Box 426, Rock Products
542 S. Dearborn St. Chicago, Ill.

Sell your discarded equipment! It's probably worth more than you realize. Try an advertisement in this section.

CONSTRUCTION EQUIPMENT

For Sale or Rent

Overhauled in our own shops and guaranteed subject to thorough trial in service

19—**LOCOMOTIVES:** Steam and Gasoline 7 to 50 tons, Narrow and Standard Gauge.

252—**DUMP CARS:** 4-yd. to 30-yd. Hand and Air Dump, Narrow and Standard Gauge.

26—**GASOLINE CRANES, SHOVELS, DRAGLINES:** ¾ to 1¼-yd. Link-Belt, Northwest, Harnischfeger, Koehring.

7—**LOCOMOTIVE CRANES:** 15 to 30-tons, Ohio, Brownhoist, Industrial, Browning.

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STEAM SHOVELS: Full Revolving Caterpillar and Railroad Types.

SPREADER CARS: Narrow and Standard Gauge, All-Steel, Air-Operated.

DRAGLINES: Caterpillar or skid and roller mounting, 50 to 155 ft. booms.

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Address Box 425,
care of ROCK PRODUCTS
542 South Dearborn St. Chicago, Ill.

WANTED TO BUY

good limestone quarry with one or two kilns. Must have good limestone and good market. Write

Box 423, care of Rock Products
542 South Dearborn Street Chicago, Ill.

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ROCK PRODUCTS is the business journal of the rock products industry, its readers are men of influence, and their buying power is big. An advertisement in this classified department will be seen and read. Make your wants known and see how quickly they will be satisfied.

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Plans and Specifications for Improvement of Old Plants or Construction of New. Supervision of Construction. Advice as to Improvement of Product or the Economic Operation of Plants. Reports on Properties and Raw Materials. Appraisals.

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ENGINEERS
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Builders for over twenty years of cement plants, stone crushing plants and gravel washing plants. Reports, Investigations and Appraisals.

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CONSULTING ENGINEER
35 Doane Street, Boston, Massachusetts.

Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.

Consultation Examinations Reports
Design Construction Supervision

POSITIONS WANTED

OPERATING SUPERINTENDENT—AVAILable for producers of crushed stone or gravel operations. Thoroughly experienced and efficient, excellent reputation as result getter. Location immaterial, but prefer South or Southwest. Address Box 412, care of Rock Products, 542 South Dearborn Street, Chicago, Ill.

WANTED—A POSITION AS ASSISTANT superintendent or general foreman of quarry and crushing plant. Would consider place as timekeeper if above not available. 25 years' experience in this kind of work. Address Box 419, care of Rock Products, 542 So. Dearborn St., Chicago, Ill.

RESEARCH SERVICE DEPARTMENT,
Rock Products and Cement and Engineering News,
542 So. Dearborn St., Chicago, Ill.

Please send me catalogs and prices concerning the following items checked below:

.....Air Compressors.
.....Agitators.
.....Anvils.
.....Bags.
.....Bag Printing Machines.
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.....Blast Hole Drills.
.....Blasting Powder.
.....Block Machines.
.....Bodies, Motor Trucks.
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.....Brick Machines.
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.....Conveyors.
.....Cranes.
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.....Crushing Plants.
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.....Derricks.
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.....Dragline Cableway Excavators.
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.....Drill Sharpening Machinery.
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.....Drills, Tripod.
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.....Fire Brick.
.....Floor Tile Machines.
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.....Gears.
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.....Hand Shovels.
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.....Lime Hydrators.
.....Lime Kilns.
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.....Loaders, Wagon.
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.....Locomotives, Gasoline.
.....Locomotives, Steam.
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.....Machine Shop Equipment.
.....Magnetic Separators.
.....Mixers.
.....Motors.
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.....Moulds (Building Tile, Block, Burial Vault, Etc.)
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.....Packing, Piston.
.....Packing, Sheet.
.....Packing, Superheat.
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.....Perforated Metal.
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.....Pipe, Machines.
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.....Pulverizers.
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.....Pumps, Electric.
.....Pumps, Gasoline.
.....Pumps, Steam.
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.....Respirators.
.....Rock Drills.
.....Roofing Tile Machines.
.....Rope Drive.
.....Rope, Manila.
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.....Valves.
.....Washing Equipment.
.....Weighing Equipment.
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.....Winches.
.....Wire Cloth.
.....Wire Rope.
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Individual.....

Address.....

City.....**State**.....

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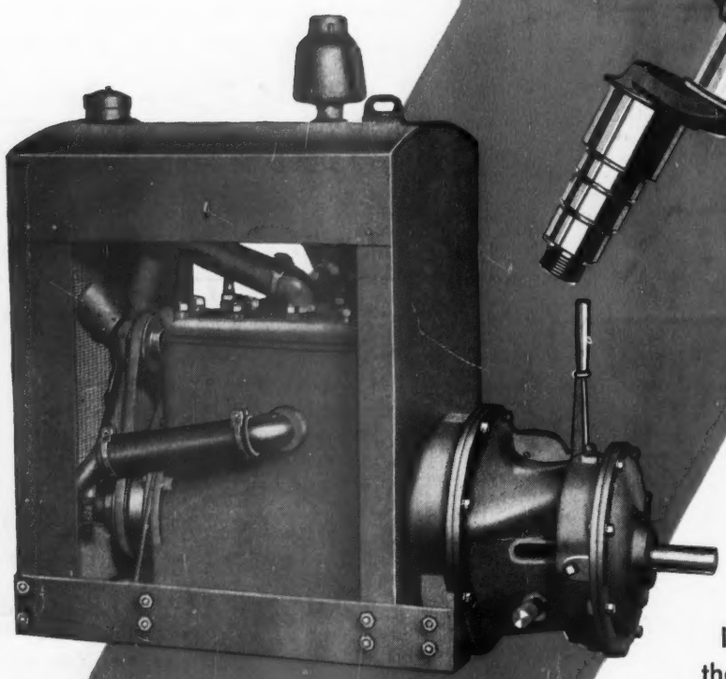

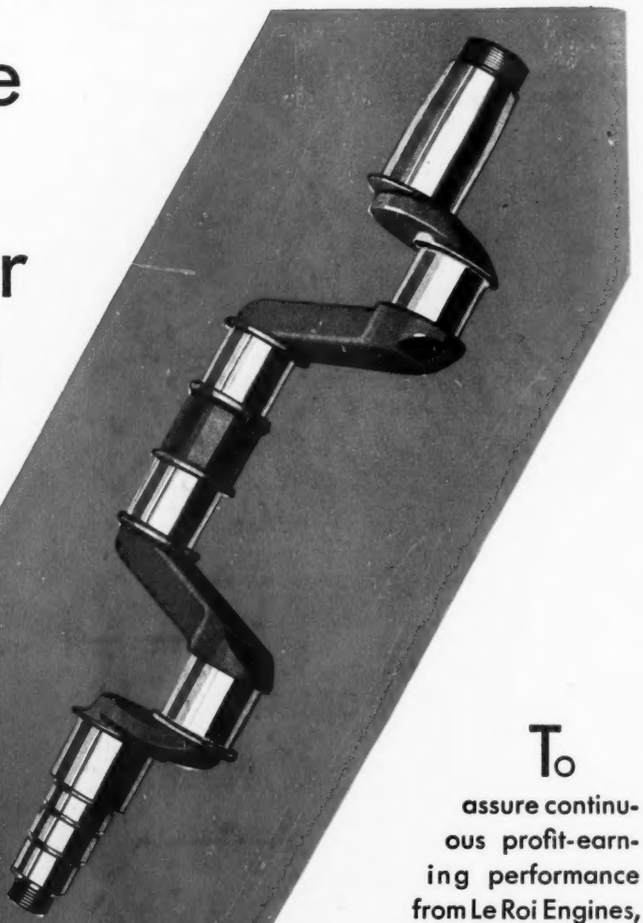

LE ROI FOR DEPENDABLE POWER

To assure continuous profit-earning performance from Le Roi Engines, the crankshaft is made of the toughest steel obtainable, *and guaranteed for the life of the engine!*

Because of this inbuilt dependability, Le Roi Engines establish unusual records of heavy-duty service. They deliver the maximum rated horsepower under full load, and perform at top speed with the lowest operating costs.

Le Roi Engines are adaptable to a wide range of power needs. As power units in concrete mixers, portable saw rigs, industrial tractors and locomotives, air compressors, hoists, centrifugal and force pumps, portable conveyors, loaders, and other equipment, they are favorably known throught the industrial world.

LE ROI COMPANY, *Milwaukee, Wisconsin*

LE ROI ENGINES

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